MAY 18 1984

# GO-ALRT

## Hamilton Project

URBAN DOCUMENTATION CENTRE
RESEARCH UNIT FOR URBAN STUDIES
McMASTER UNIVERSITY
HAMILTON, ONTARIO

# Information Report Related to Public Issues and Concerns

Ministry of
Transportation and
Communications

Ontario

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# GO-ALRT PROGRAM

# HAMILTON PROJECT

## INFORMATION REPORT

## RELATED TO

## PUBLIC ISSUES AND CONCERNS

URBAN DOCUMENTATION CENTRE
RESEARCH UNIT FOR URBAN STUDIES
McMASTER UNIVERSITY
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## INTRODUCTION AND EXECUTIVE SUMMARY

At the end of February, 1984, two reports, the "Recommendation Report for Route Selection" and the "Technical Summary Report, Evaluation Stage" were tabled at the Regional Transit Committee. The recommendation of the Municipal Technical Advisory Committee and the Project Team, was that the York/Woodbine Tunnel Option with a Highway 403/Macklin Road line station and a Wilson Street terminal station, should be selected for GO-ALRT service to Hamilton.

A subsequent public drop-in centre was held to answer questions related to the recommendation, on March 22, 1984. A Public Forum was also conducted by the Social Planning and Research Council on March 24, 1984. Subsequently, public briefs were received at a joint meeting of Regional and Hamilton City Councils on March 29, 1984.

This report addresses the major issues and concerns raised in the briefs submitted to the Council and at the public forum, and provides direct answers to each item. This report was prepared by the GO-ALRT Project Team, under the direction of the Municipal Technical Advisory Committee. The report is a compilation of material previously supplied to the public, and in a few cases represents new information.

This report is part of an ongoing public participation process. In Appendix A is a comprehensive listing of the specific dates and events organized by GO-ALRT, which have provided opportunities for area elected officials and the public to be involved in the study process. Through all of these means, GO-ALRT has made available the findings of the study at the various specific steps of the study.

## SUMMARY OF ISSUES

Through the study process and particularly at the March 29th public briefs to Councils several issues were raised. These are responded to in detail in the body of the report. This Executive Summary provides a very condensed overview of the issues and the responses.

## Need and Justification

There have been several issues raised by the public related to the need and justification of the GO-ALRT System.

### Travel Demand

Issue:

**What travel demands pertain now and in the future that justify the construction of the GO-ALRT System?**

Response:

Growth on the GO Transit System has increased dramatically since introduced in 1967. Trip making into the future is projected to increase 4 to 5 times in the total area whether it be in Hamilton, Toronto or Oshawa.

### Freeways or Transit Systems

Issue:

**The existing transportation systems accommodate travel demands adequately. Why are major improvements required into the future?**

Response:

If the future travel growth were to be accommodated on the Highway system, 6 to 8 additional traffic lanes would be required on the QEW corridor. This is clearly impossible. Equally, buses in mixed traffic would provide no clear advantage over the automobile, while exclusive bus lanes would not be practical. Using the existing rail system would be constrained by the low speed freight and other services that use the rail corridor presently. To update the rail system to adequate performance would cost the same as GO-ALRT.

The GO-ALRT operates on an exclusive and separate right-of-way and uses modern technology. Service can be scheduled to the specific demands and requirements of the travelling public. The speed and frequency of service will be greatly improved over any operation that could be achieved utilizing existing shared track facilities or existing GO Train technology.

## Oakville Transfer

Issue:

It has been suggested that the transfer from the GO-ALRT to the GO Train system at Oakville is unacceptable to the travelling public.

Response:

Currently 800 people a day transfer from the train to the bus at Oakville for destinations in Hamilton and Burlington. The current transfer is 10 to 13 minutes and takes place in an outside environment that is not weather-protected. The future transfer will be in a weather-protected environment. It will take in the order of 3 minutes and will be directly from one vehicle to another waiting vehicle. No delays are anticipated or expected. The transfer is not permanent but will be eliminated when service from Oakville to Union Station is initiated.

## Flexibility for Extension

Issue:

Extension to Stoney Creek has been a stated local municipal objective.

Response:

York Blvd. route is the only route that can be logically and practically extended as a continuation of GO-ALRT service.

## Facilities for the Handicapped

Issue:

**How and to what extent will the handicapped have access to the GO-ALRT System?**

Response:

The GO-ALRT stations will accommodate the ambulatory and will incorporate provisions to make full access possible at some future date.

## Study Two Options

Issue:

**Two options should be further studied to permit a more in-depth evaluation.**

Response:

Studies, sufficient to enable route determination, are available. Further study would provide information superfluous to the route determination and would only delay the decision.

## Land Use Development

Issue:

**To what extent can GO-ALRT stimulate development to the downtown area?**

Response:

Experience elsewhere has indicated that fixed rail transit systems can and do have a major impact in assisting development, provided that other prerequisties for development are also present.

**TH&B Route**

Issue:

**The TH&B Route is a logical option and should be utilized.**

Response:

Although initially attractive, the TH&B route would:

- not be acceptable to the TH&B on a shared track arrangement
- require the complete reconstruction of the tunnel to four tracks, which would be extremely disruptive due to the restricted right-of-way on Hunter Street and proximity of apartment buildings underground structures.
- require Hunter street to be out of service during construction. Grave concerns would exist related to emergency access to the apartments and homes located on the Hunter Street.
- would be the most expensive option and is not realistic.

**Underground Routes**

Issue:

**Tunnelling should be utilized to bring GO-ALRT service into the downtown area of Hamilton.**

Response:

Tunnelling is typically 3 to 5 times more expensive than is an elevated guideway, and due to the poor soil conditions in downtown Hamilton expensive techniques can be expected. In addition to being expensive, underground route options will be extremely disruptive during construction and are to a large extent controlled by underground development.

## Ferguson Undergound

Issue:

**An underground route for Ferguson Ave. has been suggested particularly for the downtown area.**

Response:

It is not practical to tunnel under the Canadian National Railway. The underground section consequently could not start until just north of Cannon St. Nevertheless the cost would be in excess of $200 million if the Wilson Station were utilized. Any marginal benefits would not justify the added expenditure.

## Alternative Station Locations

Issue:

**Several alternative station locations have been suggested for the downtown area.**

Response:

The Wilson Street station provides the balance between the existing and future development. It is well placed relative to existing development, and at the same time, it can take advantage of the future ridership that can be stimulated by the redevelopment of the under-utilized downtown lands.

## Station Utilization

Issue:

**To what extent can the alternative station locations accommodate the travel demands of Hamilton residents and of the Region in general?**

Response:

The Wilson Street station provides the best location for downtown trip making and for connections to the Hamilton Street Railway. The Hwy 403/Macklin Road station is the only station that properly accommodates automobile oriented trip making for Hamilton residents within Hamilton. Without this station the downtown station area would be overloaded as would parking at Waterdown Road and other Burlington stations. Hamilton commuters would not find parking and many would be discouraged from using GO-ALRT.

**CNR/Ferguson Option**

Issue:

**The CNR/Ferguson option has been suggested as having "reasonable" social environmental impacts, while providing a downtown station terminal, at a cost competitive price.**

Response:

Ferguson Ave. option has not been recommended because:

- An additional station cannot be provided in Hamilton to provide full service to the travelling public.

- Together with the Perimeter Industrial Road, up to 50 or more homes may be required on this option than would be required on the York Blvd. option. As well the road system in the north end would be seriously disrupted.

- The natural environmental impacts of the Ferguson route are higher than the York Blvd. route.

- There is no significant advantage for this route over York Blvd. in terms of land use development potential, since both terminate at Wilson St.

- A logical, through extension of GO-ALRT service to Stoney Creek is impractical. As well the ability to provide service to Hamilton will be constrained by track geometry on Ferguson Ave.

Nevertheless it is recognized that the construction costs are lower and that the visual impacts on York Blvd. are avoided.

**Natural Environment**

Issue:

**Cootes Paradise and the gateway entrance to Hamilton is of particular concern from a natural environmental point of view.**

Response:

The Highway 403 route option has less natural environmental impact than does the CNR/Ferguson route option.

**Kay Drage Park**

Issue:

**The safety of utilizing a completed landfill site for a station as well as the loss of recreational facilities, are of concern.**

Response:

Engineering solutions to control the discharge of methane gas are available and will be incorporated to ensure that Kay Drage Park can be used safely. For the lands not required for station purposes, vehicular access will be substantially improved, and parking facilities will be available. The possibility of replacement recreational lands is also being pursued.

## Hamilton Cemetery

Issue:

**The proposal to tunnel under the Hamilton Cemetery has raised concerns about the graves in this area.**

Response:

The tunnel will be in excess of 30 feet below the ground level. Construction techniques exist and will be utilized so that no change will occur to the cemetery area. Soils investigations have been undertaken to confirm this.

## Woodbine Crescent/Expropriation Process

Issue:

**Regardless of route, certain homes and businesses will be relocated. The way that the property owner will be treated is of concern to those directly affected.**

Response:

The expropriation process protects the individual property owners. Owners will not be forced out of their home, but will be allowed adequate time and opportunity to receive a fair and equitable settlement. Experience indicates that mutually successful conclusions are generally achieved, outside of the Expropriations Act, in all but a very few cases.

## York Blvd. Elevated Guideway

### Visual Impact

Issue:

Concern has been related to the visual impact of the elevated guideway on York Blvd.

Response:

Different than systems in New York, Chicago or the Gardiner Expressway in Toronto, the elevated guideway on York Blvd. will be a narrow, modern design. The guideway will be totally contained within the grassed median of York Blvd. Modern construction techniques will maintain the new appearance of the guideway. Details will be worked out with the appropriate municipal staff, to ensure that the guideway is built in the most modern and pleasing manner and that appropriate landscaping and architectural measures are included.

### York Blvd. Traffic Hazard

Issue:

It has been suggested that the columns for the guideway will be a hazard to traffic on York Blvd.

Response:

The lateral clearance to columns exceeds the standard safety requirements, and the distance between through traffic and columns supporting the guideway is substantially greater than existing traffic street furniture impediments that are already on York Blvd. and on other Regional roads and City streets.

## Interference during Construction

Issue:

**Construction of the elevated guideway on York Blvd. will substantially impede the flow of traffic and have severe social disruption.**

Response:

Only one lane of traffic in each direction will be out of service during construction. Elevated guideway construction is substantially quicker than underground construction, and has very minimal impacts relative to the major disruption that will be required to build an underground system on York Blvd.

## York Development Guidelines

Issue:

**Guidelines to control development on York Blvd. were established in 1979 by Hamilton Council. It is suggested an elevated GO-ALRT guideway would not be compatible with these.**

Response:

Guidelines refer to York Blvd. as the regional entrance to the city to serve both pedestrians and cars. Specific mention of rapid transit facilities was not part of the guidelines. The GO-ALRT is not in direct conflict with these guidelines.

## Downtown Property Impacts

Issue:

**A new right-of-way is required for the recommended route, easterly from Hess Street and it is claimed that property impacts will be severe.**

Response:

There are property impacts in the downtown area. These are limited but may be severe to those involved. Every effort will be made to properly identify and reduce the effect of the impacts including noise and vibration mitigation, municipal zoning and equitable compensation for lands taken. Municipal staff would be involved in this phase in conjuction with GO-ALRT personnel.

More specifically, in dealing with the individual properties, the following is noted:

Sir John A. MacDonald School

The guideway would pass some 7 to 8 m (23-26 ft.) from the solid south facing red brick school wall. Its visiblity would be mitigated with the use of plantings. The guideway would also pass over the corner of the end zone of the football field, but this should not affect play on the field. Indoor noise and vibration impacts are not expected to be a problem.

Salvation Army

The guideway would require the partial removal of two Salvation Army warehouse structures. Reconstruction may be possible. Noise impacts may affect the dormitory to the south, and mitigating measures would be reviewed.

Philpott Memorial Church

The guideway would pass immediately to the north of (behind) Philpott Memorial Church and requires the removal of the Campbell Glass building owned by the Church. Future expansion by the Church would have to be in a separate building. A connecting passageway to the main building would be feasible. Indoor noise levels in the sanctuary would not be changed discernably, although mitigating measures would be investigated particularly for the portion of the Church building adjacent to the guideway. Vibration impacts are not expected to be of concern.

G.S. Dunn & Co. Ltd.

The modern building would be avoided, but the older four storey portion of the building used to mill mustard would have to be removed. Reconstruction on adjacent vacant lands is a possibility that would be pursued.

Cambridge Clothes

The guideway would be located about 15 m (50 ft.) north of the building and noise and vibration impacts are not expected to be a problem.

Dobson Block

This is part of the proposed James Street North Heritage District and at least 3 of the 5 buildings would have to be removed. This would create some discontinuity to the James North Streetscape. Other buildings of greater heritage significance would be avoided.

Commerical Buildings

The grouping of commerical buildings on the south side of Wilson Street east of James St. would be removed. Sufficient time should be available for these businesses to relocate in the area before removal is required.

Downtown Inter-Modal Bus Terminal

Issue:

Will inter-regional bus terminal facilities be constructed?

Response:

As part of the detailed plans to be prepared for the Wilson Street station, facilities would be included for inter-regional bus services. Construction of these facilities is expected to occur at the same time as construction of the GO-ALRT station.

## CONCLUSIONS

Regardless of specific route, the GO-ALRT System, extended to downtown Hamilton has the following positive features:

- it would provide a positive stimulus for development to occur in the downtown area, particularly on the significant areas of vacant land immediately adjacent to the terminal station. The nearby Jackson Square complex provides a very good anchorage for such development.

- it would provide the opportunity for Hamilton-Wentworth Region to compete for development occurring in the greater Toronto-centered area.

- it would provide a stimulus to economic growth in the Hamilton-Wentworth Region, by providing direct and spin-off employment to contractors and suppliers in the Region.

- it would include the opportunity to construct a downtown inter-modal bus station as part of the GO-ALRT terminal station.

As well as these above mentioned benefits, the recommended York/Woodbine route for GO-ALRT service to Hamilton specifically would:

- provide a transit system that can properly and adequately serve the transportation needs both now and for the longer range future.

- provide excellent transit service for inter-regional travel, with the highest projected ridership and serve the vast majority of Hamilton trips in Hamilton, while avoiding unnecessary downtown vehicular travel and parking.

- provide the initial spine of a future Hamilton transportation (transit) system by providing an on-line station in the downtown area, after the system is extended to Stoney Creek.

- provide realistic capability to extend the system to Stoney Creek and other points further east.

On the basis of the work to date and the statements contained herein, the TAC is recommending the York/Woodbine route.

The next step in the study is to refine the design of the route. This further design will establish the precise property requirements, and will incorporate mitigating measures to reduce impacts where appropriate. Discussions with property owners will involve municipal officials where municipal committments are required. The design work will provide details for the construction of the two stations, and will consider the requirements for kiss and ride, parking, transit interface, regional bus facilities, and in the case of the Hwy. 403 station, the method to control the discharge of methane gas. All of these further plans will be fully reviewed by TAC, before they are presented to the public.

RB/eb/L:258

## 1.0 Need and Justification

The need and justification for the GO-ALRT Project has evolved over a considerable period of time and has been the subject of much careful and deliberate scrutiny. Far from being the product of a simple set of supply and demand statistics, the project need and justification arise from a complex assortment of trends, circumstances, events, precedents and desires expressed over the last decade. The following paragraphs review a number of these key conditions.

### Travel Demand

GO Transit has established a precedent for inter-regional rail and bus transit. Since its inception in 1967 GO Transit has served the Toronto-centered area and shown a steady and continued rise in patronage. From 2 million passengers in its first year, it now carries up to 23 million persons annually. The growth has influenced the service GO Transit has provided and at the same time GO Transit service has itself influenced the nature of the urban growth in the area served.

Over the course of the next 40 years growth will continue. The projected ridership growth in the Lakeshore corridor alone is expected to undergo a dramatic five-fold increase to 230,000 passengers per week day, with a doubling of the peak hour volume to 16,500.

The same trends are being reflected in the Hamilton-Wentworth Region, where the current daily two way ridership of 4,700 is forecast to increase to 11,300 by 1991 and anywhere from 16,800 to 19,500 by the year 2021. (See section 12.0).

These ridership projections are based on several factors. First, there will be continued strong population and employment growth in both the Toronto-centered area as a whole, as well as the Region of Hamilton-Wentworth and other local areas. Second, the continued prosperity and strength of the Toronto-centered area, demand increasingly stronger more efficient forms of interconnection between

the jurisdictions that comprise it. Third, the unqualified success of GO Transit clearly demonstrates that, provided with a fast convenient efficient inter-regional public transit system, people will use it rather than travel by automobile. As well, increasing gas prices and traffic conjestion have directed more riders to mass transit modes.

Local recognition of these conditions has resulted in the various municipalities located within the Toronto-centered area persistently requesting the Province to improve inter-regional transit services. Burlington, Hamilton and Oshawa all have indicated a need for a coordinated approach to transit with inter-regional connections.

In fact, the Region of Hamilton-Wentworth has specifically requested the extension of service to Hamilton.

**Transportation Response**

The transportation dilema that has confronted the Province and the Municipalities within the Toronto-centered area arise from the above conditions. The population and employment growth in the area and the public's travel patterns, have taxed the capacity of the present Lakeshore inter-regional transportation network, namely the QEW and the GO Transit Lakeshore Commuter Services. Faced with these circumstances, and in light of ever increasing stress on the systems, the Province can either further expand the freeway system or the transit system. In the former case expansion to handle projected increase in traffic volumes would require a 6 to 8 lane widening of the roadway, in the latter case the alternative is to expand the GO Transit Service. Even to the layperson, the magnitude of costs and disruption associated with the first undertaking, clearly indicates that improved transit commuter service is the preferrable alternative.

In fact this logic has been recognized by the Province for some time and was a substantial part of the rationale for the original 1967 GO Transit experiement. A significant event in the maturing of the GO Transit system was the recognition in the early 1980's that continued major

capacity improvements would be required to the GO Train Lakeshore Service. GO Transit undertook a major review of this service in 1982 with a view to electrifying the existing GO Train service which is operated for the Province by the Canadian National Railway. Findings from this study indicated that major improvements to the existing system were required, the cost of electrification to the present rail system was significant, and most importantly that a major review of all reasonable alternatives should be undertaken before the Province committed itself to a long term transit strategy.

Consequently, the Province decided to undertake a major policy review of all options before major capital investments to the interim and long-term future were to be undertaken. This review, the "GO Transit Lakeshore Commuter Service, Assessment of System Expansion Alternatives", was carried out for GO-Transit in May, June and July 1982. This assessment led to the Government's decision, and the October 1982 announcement by the Honourable James Snow of an "Inter-Regional Rapid Transit Strategy" for Metro and the surrounding areas.

**"GO Transit Lakeshore Commuter Service, Assessment of System Expansion Alternatives".**

This assessment was a major policy review that comparatively evaluated six technologies against a series of factors.

The six technologies included:

- Diesel Locomotive Hauled Bi-Level Cars.
- Electric Locomotive Hauled Bi-Level Cars
- Electric Multipli-Units, Bi-Level Cars (EMU)
- Light Rail Transit (LRT)
- Advanced Light Rail Transit Vehicle (ALRT)
- Busways

In an initial evaluation each of these technologies was assessed in terms of dimensions, weight, performance, capacity, fuel consumption and operating methods. Both the LRT and Busways were rejected for further consideration. Conventional LRT vehicles were dismissed because of the very substantial modifications that would be required to transform the vehicles from being appropriate for short haul urban transit service to being able to achieve the high speeds and greater seating capacities required for inter-regional transit service. Busways were not considered suitable due to the lack of present roadway capacity for exclusive operation and terminal facilities, the high labour requirements and operating costs and the extravagant fuel consumption.

A second round of evaluation was carried out on the four remaining technologies. Each was comparatively assessed on the basis of quality of service, operation and maintenance costs, environmental and community impact, energy conservation, policy to reduce fuel consumption, operations control and flexibility and staging flexibility. Of the four alternatives under study, the ALRT vehicle was found to be the preferred choice as it best satisfied the various assessment criteria. It has by far the lowest annual operating costs, was the most efficient in terms of energy conservation, and had the greatest operational flexibility for GO Transit. It was roughly comparable to the other technologies against the remaining criteria.

Based on the above findings, the decision was made by the Provincial Government to utilize the GO-ALRT concept for providing service to the Toronto-centered area. This, as was previously stated, was announced by the Honourable James Snow on October 7, 1982.

**Bus or Rail Service as an Alternative.**

Notwithstanding the above assessment, it has again been suggested that GO Transit consider bus or rail service as an alternative to GO-ALRT. This has been done in the specific sense of how this would apply to the West Section of the GO-ALRT Service.

In order to accommodate the projected 2021 passenger volumes, the bus fleet requirements in the QEW corridor between Metro and Hamilton would exceed 750 high capacity articulated vehicles, with 200 vehicles per hour in the peak direction at maximum load points.

The viability of including these buses "in mixed traffic" is questionnable. Not only is the QEW stretched to capacity under the current traffic conditions but buses on shared lanes are a poor transit alternative as the speed of service is no better than for the private automobile. Furthermore, setting the QEW aside, it is doubtful whether the downtown streets of both Metro and Hamilton could handle the peak hour onslaught of buses generated by this alternative.

A second bus alternative that has been suggested is the dedication of an exclusive bus freeway lane. Here too however significant problems become apparent. The need for extensive traffic control, the congestion caused on remaining lanes, and the high accident rates (as experienced in Boston and Los Angeles) coupled with the already overloaded QEW, suggest that this option would do more to hinder the transportation dilema than help it. In fact, the loss of one lane in the QEW corridor would cause the complete breakdown of the freeway in peak periods of travel. Again the large volume of buses on the terminal downtown street patterns would create extreme problems for the host municipalities, the transit operator and the passenger.

A third bus alternative is a contra-flow lane. This would require the dedication of an existing freeway lane having traffic flowing in the opposite direction from the peak flow. Once again experience elsewhere has shown that there are a number of formidable obstacles including high accident rates, high operating costs, and severe traffic congestion in the off-peak direction. These among other problems, have lead to similar schemes being cancelled in places like Boston and New York. When one contemplates this option with its apparent limitations being superimposed on the already problematic QEW, it appears as a poor solution. In fact, this scheme would also cause the complete breakdown of the QEW, but this time in the contra-flow direction.

Notwithstanding the above, it must be stated that the existing bus service is valued by the passenger and by GO Transit as being a highly successful service. The fact is however, there are limitations to the future ability to provide acceptable passenger service. A higher capacity traffic-separated system is required.

Turning to rail options as a result, the alternatives considered included diesel locomotive hauled trains and electric locomotive hauled trains on shared tracks, electrical multiple unit trains on dedicated tracks, and ALRT on a separate right-of-way. The costs and benefits of each of these options were carefully assessed with the end result being that the ALRT system clearly offered the best, most cost effective service.

Specific concerns have been expressed that GO-ALRT should utilize the existing rail facilities or at least the existing rail corridor for the provision of service. In this regard it should be noted that:

- The ALRT system because it would be owned and operated on an exclusive right-of-way, would not be restricted by the needs of freight, VIA and other rail traffic. Therefore, not only could it offer express downtown Hamilton to downtown Toronto service in 45 minutes or less, it provides the opportunity to tailor the service to the demands of the public. This speed quality and flexibility of service would not be possible if the existing rail systems were utilized.

- The ability to operate independently is very important. The section of CNR trackage from Bayview Junction (Hwy 6/403) to Burlington is the most heavily used trackage in Canada. GO-Train service would have to compete for track times if the existing CNR corridor was used. This was in fact studied and it was found that separate trackage would have to be placed if improved GO Train service were required. It was decided that, if new track is to be built, a separate service should be implemented. Nevertheless, it should be

recognized that railway and hydro lands are being utilized for major parts of the length from Oakville to Hamilton. These lands are outside the operating requirements of these agencies and through the high degree of cooperation of these agencies have been made available to GO-ALRT.

- As well as a separate right-of-way, the ALRT system uses an automatic control system, meaning that train sizes and numbers can be sized according to passenger demand. This permits tighter, more frequent scheduling. The service can be run to meet the requirements of the travelling public.

All of the above factors allow tight controlled frequent service to area residents. This level of passenger service and convenience is not possible with the existing rail technology and is a direct benefit of being independent and of utilizing modern technology and transit practices.

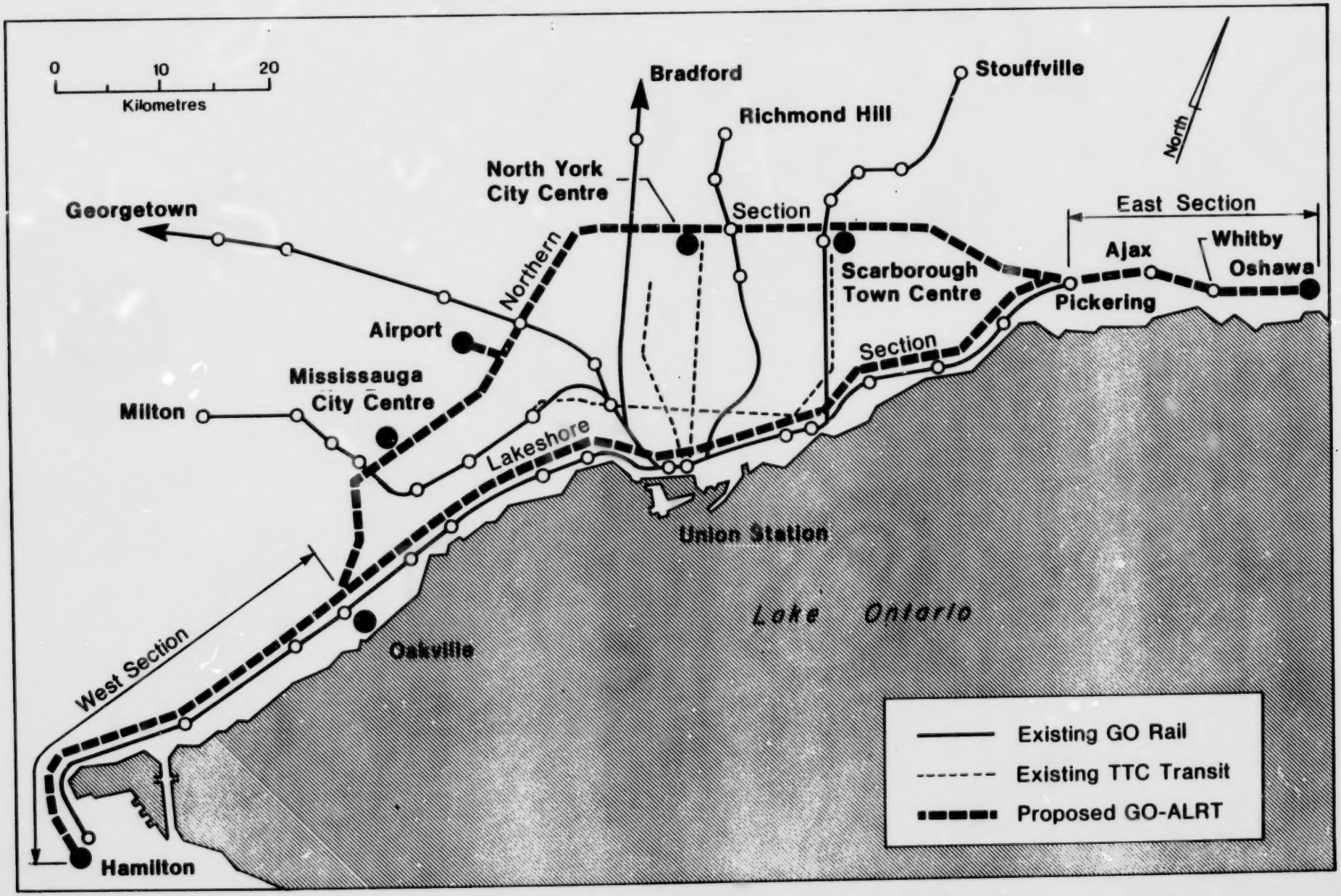
**The ALRT System - Acceptability and Technology**

The intended GO-ALRT system will be custom designed by UTDC to the specifications of GO-ALRT. The system will be used in the Oshawa section as well as in the Oakville-Hamilton section. Construction will begin in May on the Oshawa portion, and although it will utilize a newly designed vehicle, the component technology is tried, proven and tested. Further details of the UTDC experience are reviewed in appendix material to this report.

**Conclusions**

**In summary the proposed GO ALRT system was developed to provide an efficient, cost-effective solution to the current and long term travel needs of Hamilton and the Toronto-centered area of which it is a part. Fast, convenient, adaptable, and weather independent service are some of the objectives being sought through the use of modern technology on a separate right-of-way.**

The system is fully accepted for use in the Pickering-Oshawa section, which will commence construction in May of this year. Planning is underway for all parts of the remainder of the system. In the West Section, GO-ALRT has been given full endorsation by the Oakville, Burlington and Halton Region Councils.




INTER-REGIONAL RAPID TRANSIT STRATEGY MAJOR ELEMENTS

## 2.0 Oakville Transfer

**Some individuals have suggested that transferring at Oakville is unacceptable to the travelling public.**

It should be noted that presently 800 passengers a day transfer from bus to train at Oakville. The criticism that people will not transfer at Oakville does not stand the scrutiny of what Hamilton and Burlington residents are actually doing today. Notwithstanding this, the transfer at Oakville will be vastly superior to that which exists today. The GO-ALRT transfer time will be reduced to 3 minutes from the existing 10 to 13 minutes, as a result of automated scheduling and interfacing of the vehicles platform to platform. Fully co-ordinated schedules will be implemented for arrivals and departures.

The transfer at Oakville is necessary on an interim basis. As discussed in "Need and Justification", the requirements for a total system were studied. It was decided to introduce the ALRT technology. Also it was recognized that minimum transit service is presently provided west of Oakville, and therefore the new ALRT system should be provided here first. This two-fold purpose - to respond to an immediate deficiency and to start to implement the new total system - necessitates a transfer at Oakville with the present GO Train service. Alternatively, if GO-ALRT service was extended to Hamilton starting from Union Station, the improved service to Hamilton would take many years longer to implement, and a transfer would still be required at some point on the system, to allow staged construction similar to what is required on our freeway system.

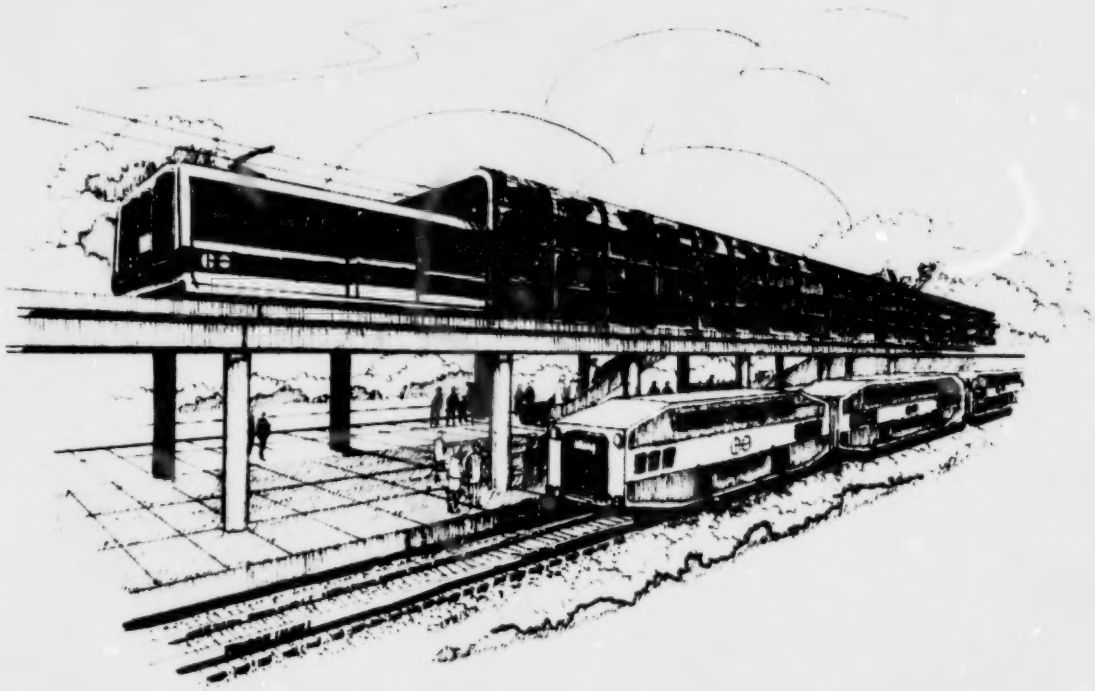
The transfer at Oakville will not be permanent. Planning studies are currently underway for continuing the ALRT System along the Lakeshore and for the Northern Section. The GO-ALRT will be continuous from Hamilton to Toronto, Pickering and Oshawa. A transfer at Oakville will not be required.

Notwithstanding that the Oakville transfer is temporary, it should be stated that due to the nature of transit, many transit trips require transferring at some point in the total system. The existing Oakville transfer from train to bus has already been detailed. As further examples, the Yonge/University and Bloor subways have passenger transfers rather than vehicle transfers between lines, and the Scarborough rapid transit service will have passengers transferring to the Bloor/Danforth subway at Kennedy Road.

GO-ALRT is designing a first class transfer. It will not be interim in terms of its quality. Very detailed studies have been undertaken. The GO-ALRT station will be located above the GO Train platforms, connected with stairways and escalators, and will be fully enclosed and weather protected.

In summary, in order to start to implement improved inter-regional transit service to Hamilton, a temporary transfer to the GO Train is requied at Oakville. Passengers will be transferring in a weather-protected environment from one train to another waiting train, which will then immediately leave the station. The station will be designed to modern standards and will be attractive and efficient.

RB/eb/L:250



- Weather Protected Environment
- Vertical Transfer Between Platforms
- Stairs and Escalators
- Co-ordinated Schedules

OAKVILLE STATION - DESIGN CONCEPT

## 3.0 Flexibility For Extensions

**Extendability of the system has been a stated local municipal objective.**

**Extension to East**

The route planning for implementing GO-ALRT service has taken as a prerequisite, that the system at some future date could be extended easterly. Study has been undertaken to locate and investigate potential corridors that may be used. Two are identified as candidates, those being along the CN and the TH&B railway lines. Both pass through Stoney Creek, the CNR continuing parallel to the lakeshore towards St. Catharines, and the TH&B swinging south towards Welland and eventually Buffalo.

The extension would appear to be more easily provided along the CNR corridor than along the TH&B. Reasons for this include the increased availability of land, the lower impacts on residential areas and the natural environment, and the more complex design and construction requirements along the TH&B. Costs would also be anticipated to be lower along the CNR because of the greater potential for constructing at-grade sections.

An extension along the CNR would also appear to be more desirable as it would provide a better service to the eastern part of Hamilton. Its location is more central to the industrial and residential areas in this part of Hamilton. A line station is possible at the Greater Hamilton Shopping Centre near the Barton Street/Kenilworth Avenue intersection. Not only would this location serve the industrial areas to the north and the shopping centre itself, but, having good access from Hamilton Mountain along Kenilworth Avenue, it serves a large population area. The possibility of shared parking facilities is available here, too.

A terminal station could be located at Highway 20 serving Stoney Creek to the south and east, as well as other communities to the east by means of the Queen Elizabeth Way. The Hamilton Mountain area can also be served by this station, especially after completion of the Red Hill Creek Expressway.

To implement an easterly extension along the CNR, it becomes necessary to access the corridor from the proposed Hamilton downtown terminal. The recommended York Boulevard elevated option can be easily extended up Ferguson Avenue towards the CNR. The extension would operate as a straight through service with the potential of short-turning trains back towards Toronto. Operations are ideal with this option.

The Ferguson Avenue option, however, does not provide for an easy future easterly extension, as it would be necessary for trains to reverse themselves and backtrack to the CNR. This causes significant operational problems as, in effect, two routes would be utilizing the same set of tracks. Operational studies have shown that two tracks on Ferguson could not accommodate all the movements that are projected. A third track on Ferguson Avenue, requiring an additional platform at the Hamilton terminal, would be needed. The extension could then only operate as a separate shuttle service necessitating a transfer in Hamilton for Stoney Creek passengers destined towards Toronto and vice versa. (See Appendix F).

The extension to Stoney Creek has been viewed as a very important objective by some area municipalities. The Province views that the longer range flexibility to extend service beyond Stoney Creek should also be protected. The best easterly extension is by following the CN corridor.

As an extension of GO-ALRT service, the extension can only be logically and realistically achieved by extending the recommended route from the Wilson Street station, northerly along Ferguson Avenue. The downtown Hamilton Wilson station will then be an on line station on a major transit system.

**Extension to South**

**The matter of a GO-ALRT extension southerly has been suggested and a very cursory evaluation has been undertaken.**

Three route options have been suggested for possible southerly extension. These are:

- tunnelling into the mountain face;
- following the CNR up the side of the mountain;
- following the Highway 403 corridor.

The extension would be extremely costly if tunnelling into the mountain were required. Due to the grade restriction of the system, the tunnel would not emerge until south of Limeridge Road. Not only would the cost of this be unrealistic, but the option would not provide service to the developed area of the mountain.

A route extension following the CNR up the mountain, would also be costly, and would introduce operational difficulties. This route also does not appear to provide service where required.

Operational difficulties would arise along the Highway 403 corridor (due to its relatively steep, continuous upgrade), although this might be the most technically realistic of the alternatives. Again limited service would be provided.

**The results of earlier studies, indicating the difficulties in locating transit routes up Hamilton Mountain, have been confirmed. Considering the terrain, it would not appear realistic to consider the GO-ALRT system/technology for southerly extension.**

## 4.0 Facilities for the Handicapped

**Representatives of handicapped groups and as well as the public in general, have asked questions concerning the accessibility by the handicapped, of the GO-ALRT System.**

GO-ALRT will be implementing provisions for the elderly and handicapped much as GO Transit has over the past few years. GO Transit has taken several major initiatives and has performed better than many other transit authoritities in this regard. As examples, they have installed television monitors at Union Station and schedule notice boards in terminals such as Yorkdale, to not only assist regular commuters but also those with hearing impairments. Visual aids such as the maps in rail cars assist all passengers, and the announcements broadcast on trains and busses benefit the visually impaired.

Specifically to aid handicapped patrons, pay telephones with volume-control handsets for hearing-impaired individuals have been installed at a height easily accessible to everyone at Union Station, Yorkdale Bus Terminal and other major stations. To assist those who drive to GO stations, designated parking spaces have been reserved for the handicapped, a provision which is enforced strictly.

GO's tariff has long included ticketing provisions for blind, deaf and disabled passengers. For those who rely on a wheelchair, GO permits an assisting attendant to ride free. "Seeing eye" and "hearing ear" dogs are permitted to travel with blind and deaf patrons. In addition, extra lighting and handrails have been installed in entranceways and stairwells to help the ambulatory handicapped.

GO Transit is also in the process of testing and installing various new features. Courtesy seating indentified by an appropriate decal and located adjacent to doorways, will be designated for the elderly and handicapped on rail cars in the near future. To improve communication between station attendant and passenger, modifications will be tested at some stations, replacing the existing ticket booth window glass with an open front protected by a grate (similar to a teller's cage). A test,

using contrasting black and yellow stair treads to make steps more visible to people with limited eyesight, was conducted at Burlington station and has been expanded since to several other Lakeshore stations. Non slip mats, coloured carpeting, and textured treads, are other measures recently incorporated.

The above indicates some of the things being done now to assist handicapped people. In addition, ongoing liaison with the Ontario Advisory Council For Physically Disabled, which is made up of representatives from the physically disabled community is maintained by M.T.C. By this means, the specific problems of the disabled are studied and recommendations for ongoing new programs are formulated.

GO-ALRT has a design team developing concepts and criteria for the design of stations. This design team is considering the requirements for the non-ambulatory handicapped. Provisions would be made in the station design now to accommodate these people later when the entire GO Transit system is similarily retrofitted. These provisions would allow for the future construction of such items as wheelchair ramps and elevators. The design of the stations will not inhibit this future retrofitting.

**The GO-ALRT stations will incorporate all current design features to permit access by the ambulatory handicapped. A station design team is developing concepts that will incorporate provisions to make full access possible at a future date.**

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## 5.0 Study Two Options

**It has been suggested that both the York Blvd./Woodbine Tunnel alternative and the Ferguson Ave. alternative should be carried forward into the next phase of the study.**

In theory it is possible to undertake a pre-design of the two options, so that a selection can be made at a future time prior to submission of the Environmental Assessment Report. So doing would, however, dramatically increase the engineering costs to complete the study, would have a major impact on the time before the EA Report could be completed and the project initiated, and would not contribute significant information related to how the routes would meet the major objectives of the study.

**Alternatively, it has been suggested that more detailed evaluation of several of the route options, should be carried out before a selection is made.**

Increased study would again only increase costs and delay the decision. Sufficient engineering work has been done on the various options, to enable a comparative evaluation of them to be carried out. It is known how each option meets the main objectives of the project:

- to provide efficient transit service to the public (fast and frequent service with efficient user access)
- to minimize social environmental impacts
- to minimize natural environmental impacts
- to stimulate development/redevelopment potential in the downtown
- to retain flexibility for future extension of the system
- to be economically feasible to construct

**Further study would provide detailed knowledge of <u>how</u> to build the system, but would not provide further information as the <u>where</u> or <u>whether</u> it should be built. Adequate information exists for an informed decision to be made at this time. Therefore, further study is not necessary and would not serve any useful purpose.**

## 6.0 Land Use Development

**During meetings both with municipal officials and the public, concerns have been raised with respect to the ability of rapid transit stations to stimulate land use development.**

The following explores the issue and also offers some comments on why the Hamilton Bus Station, CN station and TH&B station have not been the focal point of major land use developments.

Case studies in cities such as Toronto, Montreal, San Francisco, and Atlanta as well as cities in Europe, indicate that rapid transit stations on their own, do not have distinctly separable effects on urban form and activity. Rather they act as an element or even a pre-condition, to a mix of forces that effect development only when acting in concert. Based on experience elsewhere, key factors that contribute to land use development around transit stations are:

- strong demand for new office and apartment developments
- pro-development land use and other government policies
- other nearby land investment
- the availability of developable land at reasonable risk and cost
- the attractiveness of the site for development

The planning for the GO-ALRT deliberately noted this mix of conditions in the site selection phase, and in accordance with municipal objectives, sought to position the downtown Hamilton station in a location where it could provide the most positive stimulus to new development, while at the same time reinforce the viability and confidence of existing land uses.

The land use development effects associated with rapid transit stations can be evidenced in a number of cities in North America. Metropolitan Toronto provides several examples. Transit stations (subway, ICTS and conventional rail) have acted in concert with legislative, social and economic forces to stimulate development and redevelopment in the Toronto Central Business District as well as in suburban locations such

as the Kipling/Islington Area and Scarborough Town Centre. At the latter, with the ICTS line scheduled to open in a few months, two buildings by Equity Development and Bell Canada are under construction and Hilton plans to build a major convention hotel in the same vicinity. In the case of Kipling/Islington, the Shipp Centre and a host of high rise apartments are already in place, and serious consideration is being given to make the area the hub of Etobicoke, complete with Municipal Offices and major commercial retail facilities.

The Toronto examples are also noteworthy for the fact that transit stimulated development has occurred as both new development and redevelopment. In the case of Scarborough development has occurred on vacant land. In Downtown Toronto and Kipling/Islington, however, the transit stimulated projects have occurred on formerly built-up lands. This could be the case in Hamilton.

Associated with transit stimulated development and redevelopment property values rise and there is a corresponding increase in business and property assessment. Along the Yonge Street subway line in Toronto, the Toronto Real Estate Board estimated that the increase in business and property assessment generated by induced development adjacent the line, was such that the capital cost of the system was recouped within five years of opening.

At the western pole of the Toronto-centered area, Hamilton has much to gain and nothing to lose by improving its interconnections with the other municipalities that make up the area. Only through well developed physical linkages can it hope to enjoy the reciprocal benefits of providing its population with convenient access to the physical and social opportunities available in the area, while at the same time encouraging population and economic development from other parts of the area, to locate within it.

It has been a popular concern during the study to date, that if the existing bus station has not stimulated growth, why should any better results be expected from a rapid transit station. The answer to this is

as much psychological as it is factual. Bus stations do not represent the same magnitude of capital investment as a rail transit facility, and therefore they do not instill the same degree of confidence and entreprennurial incentive in the land development industry. Bus stations also do not have the same focussing ability. The fact that buses travel on roads and can drop people off and pick them up at intermediate locations, dissipates their focussing effect. Moreover because bus transit uses roadways, it is prone to the constraints (traffic congestion, starting, stopping) associated with that form of transportation. The proposed ALRT system on the other hand is an entity on to itself, and it is not constrained by the foibles of the road system. It therefore represents a higher form, better quality and more reliable type of transit. In short it is a better "people mover" and therefore presents a more desirable locational asset for developers concerned with the accessibilty of their developments.

When the question is asked about why the CN and TH&B railroads never generated development the answer is in two parts. First neither ever developed the passenger ridership to create a focussing effect. Second the surrounding social, economic and legislative environments were not suitable to attract new development or foster redevelopment.

Based on the preceeding discussions it seems clear that GO-ALRT could be a very positive force in shaping Hamilton for the future. The necessary forces seem to be present to create a growth environment but a catalyst is needed. Thus despite some local concerns and uncertainty of success "rapid transit investment may literally be the only game in Town if major desired urban-structure changes are to be generated within the forseeable future" (Knight 1982)[1].

1. Knight, Robert L., "The Impact of Rail Transit on Land Use: Evidence and a Change of Perspective" in "Urban Transportation Perspectives and Prospects", Ed. by Levinson, HS and Weant, RA, Eno Foundation for Transportation Inc. (Westport, Connecticut, 1982).

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## 7.0 TH&B Route

**It has been suggested that the use of the TH&B route is viable and should be pursued. The alternatives suggested, include relocation of the TH&B, using a single track, and different combinations of usage up to 4 tracks.**

Several alternatives have been examined and discussed with senior officials of CP Rail and TH&B Rail. The following summarizes the findings. Further details are included in Appendix C.

### The TH&B Station

The TH&B station if used by GO-ALRT, has some potential to stimulate development and redevelopment. Even though much of the local area is built up with relatively new and well occupied buildings, there is vacant land within walking distance of the station. These are located on the south side of the tracks and east of Catherine Street on Hunter. Development possibilities, however, are not as good as at the proposed Wilson Street terminal station.

If used for GO-ALRT, Kiss 'n' Ride facilities could be developed adjacent to Hunter Street. Direct transit interface would be restricted primarily to the mountain routes on John and James Streets. A direct transfer to the east-west routes would not be possible because of the distance to the station from these routes, particularly the King Street leg, as a result of the one-way street system in the City. Walking distance to the city core is reasonable, however.

### Joint Requirements

The GO-ALRT System will be electrically powered with automatic train control, capable of a top speed of 120 km/h. In the long term, train frequency is expected to be an average of 6 minutes during peak periods requiring an exclusive, grade-separated, two-track right-of-way.

The TH&B requires protection for two tracks through the Hunter Street tunnel. In fact, to-day, with some relatively minor alterations, these two tracks can be installed within the existing tunnel. It should be noted that TH&B use the tunnel for main line service to the Niagara Peninsula and Buffalo, and as the only service between the Aberdeen Yards and local freight customers. It should also be noted that the TH&B is owned by the Canadian Pacific Railroad. This track is an essential part of the wider network and is used to support the economies of Hamilton-Wentworth, the Niagara Peninsula and for international freight movements. It is not prudent to remove the current protection for 2 tracks and restrict the TH&B in perpetuity to a single track operation.

The ultimate design requirements must provide for two TH&B tracks and two GO-ALRT tracks.

**Relocate TH&B**

It has been suggested that the TH&B relocate their line to another location, thereby making their Hunter Street rail corridor available for use by GO-ALRT. The suggestion is that the TH&B use the CN lines down Ferguson Ave. and between Ferguson Avenue and the junction north of the Desjardins Canal.

This suggestion would result in permanent out-of-the-way travel for the TH&B/CP, and would seriously jeopardize the ability to support local industry through competitive service. As well the TH&B/CP mainline traffic would be permanently committed to utilizing Ferguson Avenue through the downtown area of Hamilton. At-grade crossing of major arterial roads clearly make this impossible. Furthermore, CN has indicated that their lines are already approaching capacity.

It is not feasible or reasonable to relocate the TH&B to this corridor.

**Share the Tunnel with TH&B**

It is suggested that the single track within the Hunter St. tunnel be shared with TH&B, and freight traffic be prohibited from using the track during periods of peak GO-ALRT movements.

A shared track is not realistic. First, TH&B would not be able to provide adequate and guaranteed service to their customers. Second, the GO-ALRT technology is incompatable with existing rail operations. Inadequate clearance to the GO-ALRT overhead power cantenary, schedule control and railway union considerations, are factors that preclude this option. The GO-ALRT and conventional rail cannot share the same trackage.

Alternatively, the option of a single exclusive GO-ALRT track next to the existing TH&B track has been suggested. This single track, with switches at each end, would be in the order of 700 m (2,300 ft.) long. With this length of track, and the requirement for advance clearing of trains, operating headways would need be 5 minutes or more. The second GO-ALRT train can not enter the tunnel until the first GO-ALRT train has cleared the tracks. This does not consider the situation of a train breakdown or an emergency. If this occurred, the station would be inaccessible, and service could not be provided. Two-tracks for GO-ALRT are required from day one.

Nevertheless, it has still been suggested that four tracks are not required initially. It is must be understood that if underground construction is being contemplated, at any time, it is necessary to construct the ultimate facility now. It is not practical to construct a widening at a later date. In fact, there are strong reservations to-day related to rebuilding the tunnel while only maintaining the existing TH&B operation. The additional presence of GO-ALRT would virtually preclude the later rebuilding of the tunnel. There is not sufficient space left for the necessary diversions and working room.

This would be unacceptable to GO-ALRT, the TH&B and would have severe ramifications to serving the Hamilton travelling public. The ultimate requirements could never be achieved and proper service implemented.

**Rebuild the Hunter St. Tunnel**

As stated above, the GO-ALRT requires two exclusive tracks, and the TH&B will require two tracks. The TH&B have, in fact, commented that "we must retain the ability to revert to double track operation through the

tunnel and beyond to Main Street Junction to protect any future need for additional facilities to handle increased traffic volume".[1]

**Therefore, the only realistic alternative is to construct two GO-ALRT tracks north of two TH&B tracks (see sketch following), with GO-ALRT extending to the original passenger platform at the TH&B Station.**

The rebuilding of the tunnel would have major and serious ramifications to the Hunter Street area due to the extremely limited space available. The following is particularly important:

- During the construction period Dundurn Street and Hunter Street would have to be closed.

- During this period, property access to the adjacent residences and apartment buildings will be a major problem. This is of particular concern for emergency access, such as for fire and ambulance service.

- After construction, Hunter Street would either have to be closed between James Street and City Hall or be elevated to pass over James Street, with access to Hunter Street from James Street and MacNab Street being discontinued. The former alternative is not acceptable to City officials because of the relatively high traffic volumes carried by the street and the relief that it provides to other main arteries in the city core, as identified by the Downtown Hamilton Action Plan. The latter may not be acceptable because there would not be adequate vehicular access to the properties on the north side of Hunter Street, west of James Street.

- The design and construction complexities to reconstruct the Hunter St. tunnel will be extremely difficult, with consequential impact or damage to adjacent properties a real possibility.

- o The estimated $270 million construction cost is the highest of all options studied. Other more economically realistic routes are available.

**The Institutional Question**

**Some people have indicated that the inability to use the TH&B tunnel is not an engineering constraint but is institutional in nature.**

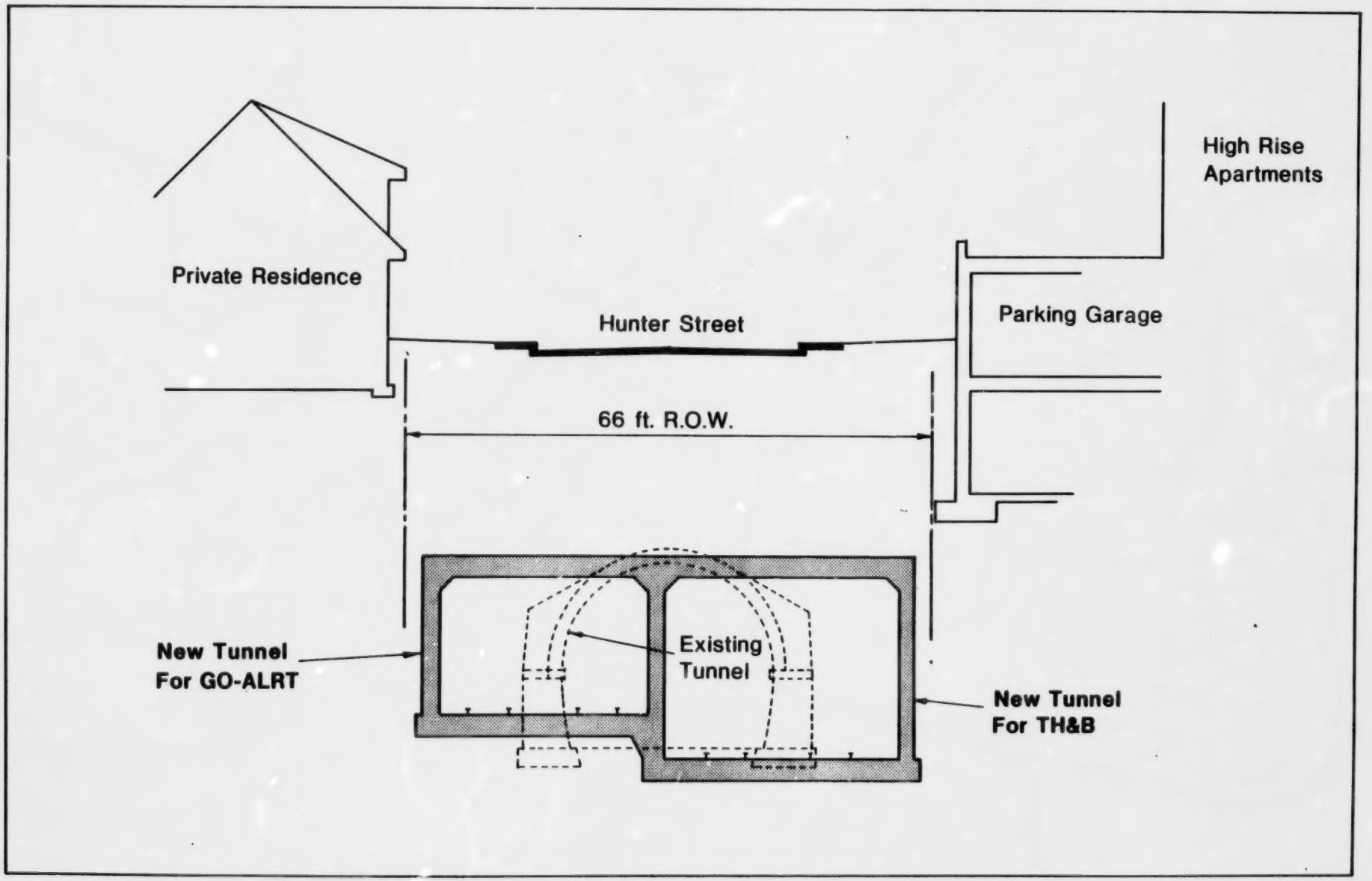
This is not the case. In fact, the CPR have fully cooperated with GO-ALRT, particularly in Oshawa where the CPR corridor is practical for GO-ALRT usage. Further, in Hamilton, they have indicated that the TH&B station could be used by GO-ALRT.

The CPR however have a mandate with associated responsibilities and do not consider either the joint use or reconstruction of the Hunter St. tunnel as viable. In fact, the CPR have voiced strong objections to consideration of utilizing the TH&B alignment due to the major disruptions to their customers that would result. They state that they "cannot see our way clear at this time to agreeing with what you (GO-ALRT) have proposed with respect to the tunnel. Our railway and your GO-ALRT are not compatible and, with the limited space available, the sharing of our property through the cut and tunnel is, in our view, simply not viable".[1]

The Province recognizes this and the role the CPR plays in supporting the economic viability of industries in the Hamilton-Wentworth Region.

**In summary, it is not worthwhile to pursue the TH&B option due to several major considerations, including high construction costs, lengthy construction time with associated emergency and day-to-day access, and difficulties in allocating sufficient trackage to the TH&B and GO-ALRT.**

1. Letter from Mr. W.J. Munford, Manager of Development, Eastern Region, CP Rail, to GO-ALRT, October 25, 1983.




TYPICAL CROSS SECTION FOR TH&B STATION OPTION

## 8.0 Underground Routes

**It has been suggested that to reduce property and visual impacts in Hamilton, underground route options be given more study.**

Around the world today, transit authorities are faced with the problem of providing increased service with limited availability of funds. Underground systems are highly labour intensive, adding enormously to their costs (three to five times as much as elevated systems). Because of this, transit authorities in North America and elsewhere have built or are contemplating elevated transit systems. A few specific examples include Detroit, Miami, Washington, Vancouver, Scarborough, London, Athens, Newcastle-on-tyne, Lilles, Atlanta, Rotterdam, Amsterdam, Frankfurt and Tokoyo.

Problems related to tunnelling in Hamilton specifically include:

- The sandy soils and the relatively high water table in the downtown area. These conditions may result in sloughing, ground movements, and settlements endangering building foundations. The water table would need to be lowered during the construction, changing the natural groundwater conditions in the area. After completion of the work, continuous dewatering of the tunnel would be required.

- The presence of piles and caissons. As most of the buildings in the downtown area are founded on these, it would be virtually impossible to bore a tunnel beneath an existing structure. Cut-and-cover construction is the only practical method, and would require acquisition of the lands and removal of buildings for its right-of-way.

- The presence of utilities. Underground services that interfere with a tunnel alignment must be relocated.

- Difficulty of implementing an easterly extension. To continue the extension in a tunnel is expensive, and yet to transition to an elevated guideway may not be feasible in the densely developed downtown area. The transition is 300 m (1000 ft.) long and should be done clear of the downtown area. As a result, the costs for the extension will be excessive, making it prohibitive to implement.

Other problems associated with tunnelling include:

- Provision of emergency access to adjacent properties during construction. Cut-and-cover tunnelling would be disruptive to vehicular access.

- Detours. Public travel wold be inconvenienced during construction.

The GO-ALRT system has been developed specifically to provide a rapid inter-regional transit service, and at the same time to achieve it at a reasonable cost. Lightweight vehicles combined with modern structural design, has resulted in a pleasing elevated guideway for use in urban areas, which is cost-effective, for use where at-grade construction is not possible.

**The costs and problems associated with underground route options are severe. It would cost $50 million to $75 million per kilometre to construct a tunnel, which is 3 to 5 times more than the $15 million per kilometre required to construct the elevated structures. It is difficult to make this kind of investment in the economic climate that we are now in. As is being found by transit authorities elsewhere in the world, the capital cost of such an underground system is prohibitive.**

## 9.0 Ferguson Underground

**An underground route on Ferguson Ave. has been suggested particularly for the downtown area.**

This alternative has only recently been suggested by local citizens as an alternative to the recommended route. It was investigated during the route generation phase of the project, at which time it was not deemed worthy of additional study. The following describes the reasons.

At the north end of Ferguson Avenue, it is necessary to cross the C.N.R. mainline tracks. If the route passed beneath the CNR, the bottom of the tunnel would be at least 15 m (50 ft.) below ground surface, placing the top of the tunnel below the water level in the Bay. Resulting construction costs would be prohibitively high, and continued dewatering would add to the operating costs of the system. This is not a feasible solution.

Therefore the route would need to continue as the Ferguson elevated option presently does, and be elevated over the CNR. As the transition from elevated to underground would be a physical barrier for a considerable distance, it should be located so as not to block a major east-west traffic artery.[1] On Ferguson Avenue, the transition could only occur south of Barton Street where it would extend the full length of the street between Barton and Cannon Streets. To achieve this, the profile required is substandard (3.5%), and is located only a very short distance from the proposed Wilson Street station, requiring trains leaving the station to climb this grade from a standing start. This contributes further to the poor operational characteristics of the Ferguson route option. (See Appendix F).

1. The transition from underground to elevated for the recommended route is located in the median area on York Boulevard, and the ground slope is favourable for its design. In this case, the length is only 210 m (690 ft.) and the profile grade is 3.0%. In addition, since it is in the median, property access on both sides of York Boulevard is maintained, except that the left turn onto Kinnell Street must be eliminated.

A bored tunnel in the downtown area is not practical (see Item 8.0). A cut-and-cover tunnel would be the only feasible alternative construction method, and would follow the same routing as does the elevated option. Therefore, both underground or elevated alternatives would require the acquisition of the same right-of-way and have many of the same direct property impacts.

The locations of existing major buildings (Police Station, Dr. J. Edgar Davey School, MacKenzie Convalesent Home, Main Fire Station, etc.) limit the number of possible routings to a downtown terminal station. As discussed in item 10.0 "Alternative Station Locations" and in Apendices D and E, a study of terminals located on Ferguson at King or on King Williams Street was carried out. These terminals were found to be less desirable than the Wilson Street site, therefore a station location further south of the proposed Wilson Avenue site is not recommended.

The estimated costs for an underground Ferguson option will vary depending upon its actual design and the length required. They range from $200 million to $295 million.

The additional impact of the removal of up to 50 homes on Strachan St. when combined with the Perimeter Industrial Road, would still be required with this option.

If an underground route option could be justified, the York Boulevard corridor would be recommended. This underground option would provide the best transit service, with the least disruption during construction, and would be the least costly of all underground options studied to construct.

**In summary, an underground Ferguson Avenue option provides the benefits of reducing the impact on Beasley Park and reducing the long term social impacts in the downtown area, but at the same time causing increased impacts between Barton and Cannon Streets. The route's undesireable features are not resolved. These include the operational problems, the removal of housing for the Perimeter Industrial Road, and the poorer inter-regional service provided by the single downtown station. Therefore, the marginal benefits do not justify the added expenditure for an underground route on Ferguson Avenue.**

## 10.0 Alternative Station Locations

**Several alternative station locations have been suggested for the downtown area.**

Criteria were established for the location of GO-ALRT stations in downtown Hamilton. Many factors are brought into consideration.

First, the availability of a suitable site, preferably vacant or with low existing usage, is a significant factor towards fitting the station into the built environment. The station should be compatible with adjacent land uses. Secondly, a site located east of James Street and north of King Street would compliment the objectives of the Central Area Plan and the Downtown Hamilton Action Plan.

Pedestrian access from residential and employment areas, parking lots and "non-employment" attractors such as the arena, convention centre, Hamilton Place, commercial shopping areas, and hotels is another important factor. These should be within 600 m (2,000 ft.) walking distance.[1] In addition there must be vehicular access for taxi pick-up and drop off, and a kiss 'n' ride facility.

Transit interface with HSR is ideally provided on-site or with bus stops within a reasonable walking distance. Hamilton is unique with its system of one way streets. One leg of a bus route may be within walking distance of the station but the return leg may not. Thus it is often difficult to provide convenient transit interface for all bus routes.

1. Note:

   "Acceptable walking distances from origin to boarding stop and from alighting stop to destination is usually taken to be 0.3 to 0.4 mi (0.5 to 0.6 km); such figures, of course, do not apply to the elderly and handicapped". From Transportation and Traffic Engineering Handbook, Second Edition, Institute of Traffic Engineers.

   "Whereas heavy rail transit's "sphere of influence" might encompass a radius of 2,000 ft. (three or four city blocks) or more, light rail transit seems to be somewhat less, perhaps one or two city blocks at most." From Journal of the American Planning Association, Spring 1984. Article "Light Rail Transit and Urban Development" by Robert Cervero. Editorial Comment: In this article, light rail transit consists of street cars; GO-ALRT in the content of this article is in the category of heavy rail transit .

The ideal station layout has a centre platform. There must be convenient pedestrian access to the centre platform via stairs and escalators, from a concourse area separated from, but adjacent to, other pedestrian activity areas.

There should be no physical constraints (topography, buildings, etc.) prohibiting the train access to the station. As examples, the presence of Jackson Square, the Edgar Davey School and the Police Station, prevent locating an access route crossing these properties.

Station locations are also directly affected by the system design requirements for the various route alternatives. The platform is 180 m (590 ft.) long with a requirement for a 22 m (72 ft.) approach tangent. These space requirements must be straight both horizontally and vertically. Also the safety requirement for a 112.5 m (369 ft.) run-out beyond the station is a major determinant in the technical feasibility of a given location.

Taking all of these factors into account, eleven downtown station locations were evaluated. Some of these, which appear to continue to have public support, are reviewed following and are compared to the recommended station located at Wilson St.

A more detailed evaluation of these is included in the Appendices D and E of this report. The reader is also referred to item 6.0 of this report.

A station on Ferguscn Ave. at King Street is somewhat better from an operations viewpoint than the Wilson Station with access from CN/Ferguson, but provides no advantage in construction costs and causes increased social environmental impacts. Most important, the station location offers poor initial service to the pubiic since it is not convenient to existing employment and to transit routes. The route is also in close proximity to residences fronting onto Ferguson, and reduces the ability to provide emergency services to properties adjacent to the route. Its ability to stimulate new development is likewise not as good, and may be possible only in the long term.

A station located on the south side of King William Street would have property impacts extending from Ferguson Ave. to mid block between John St. and Hughson St. Thus the social environmental impacts and the construction costs are greater. Its ability to stimulate new development is not as good, and would be in conflict with a recommendation of the Downtown Hamilton Action Plan which identifies King William Street as a "specialty node which should be played up as a unique intimate shopping street".

The above two station locations were identified by some people as providing better service to the King St. East commercial area.

The Wilson Station was however recommended as it best fits the technical criteria, and at the same time strikes a balance between existing and future developments. This is vital as the transit system must be placed so that good ridership is achieved at "day-one", that is it must be well placed relative to existing development, while at the same time be placed to take advantage of the future ridership that can be created by redevelopment of under-utilized downtown lands.

## 11.0 Station Utilization

**Several individuals have asked concerning ridership projections for the GO-ALRT system, and how these projections might vary for various alternative station locations.**

The recommended plan for providing GO-ALRT service to Hamilton would have a terminal station at Wilson St. with a line station at Hwy. 403/Macklin Rd. Alternatives to this as suggested by members of the public, would have a single terminal station at either Wilson St. or at the CNR station. Ridership projections have been prepared for each of these scenarios.

First, overall ridership projections have been made for the horizon years of 1991 and 2021. The figures for 1991 reflect the expected ridership based on the improved, more efficient level of transit service to be provided by GO-ALRT. Two sets of figures are provided for year 2021. They are based on a modest population/employment growth (Scenario A) for the Region to 490,000/240,000 people, and a higher growth (Scenario B) to 600,000/273,000 people. Both growth scenarios are possible, and no effort is made herein to suggest the more likely one.

The daily two-way trips served in Hamilton, existing and projected are:

| Year | 2-Way Trips | |
|---|---|---|
| 1983 (Existing) | | 4,700 |
| 1991 | 2-3 times, up to | 11,500 |
| 2021 (A) | 3-4 times, up to | 16,800 |
| 2021 (B) | 4-5 times, up to | 19,500 |

The above projections are for the recommended route. Table 1 (following) shows the allocation of these riderships to the various stations. In summary the major consequencies are :

- o The recommended route will bring the inter-regional transit service to the people, rather than requiring them to travel to get it. 100% ridership results.

- o Conversely, if a terminal station is provided at Wilson St. only, the ridership will reduce to about 80% of these figures. This is because some people will have to travel to Burlington to access the GO-ALRT.

- o Similarly, with the CNR station as the only terminal, the ridership will reduce to 60%. In this case, a larger number of riders will have to travel to Burlington, reflecting that this station has poorer transit access than at Wilson St.

Table 2 indicates the number of Hamilton-Wentworth trips that would be forced outside the Region to access/egress the system. The following is significant.

- - The recommended route does not serve all Hamilton trips in Hamilton. Some east-end trips will utilize the Skyway and the Fairview/Appleby stations as these are the most convenient stations.

- - However, the Wilson Station creates a doubling of the Hamilton trips to stations outside the Region. These trips will be from all parts of the Region and are, in effect, those Hamilton residents who didn't find a parking spot in Hamilton.

- - The same applies for the CNR station option but more so.

If Hamilton riders were required to travel to Burlington to access the system, there are consequences other than just the out-of-way travel. Stations are planned at Waterdown Rd., Burlington Center, and Appleby

Line. All have large areas of parking. In fact, these lots are the maximum workable size. Even so, an adequate number of parking spaces will not be available in future years, particularly if Hamilton trips are diverted.

Consequently, the Hwy 403/Macklin Rd. station is required, to a) serve the Hamilton trips and to b) avoid a major overload of the other station locations. Stated another way, if Macklin is not built, overloads will occur in Hamilton and Burlington. Potential riders will be discouraged and riders will not use the GO-ALRT System.

In the longer term, after the system is extended easterly, a station in the Hwy 20 area will provide parking relief for the other Burlington stations.

On considering the two-way ridership projections, it can be seen that the CNR station as a terminal will result in the lowest ridership in Hamilton and the lowest on the GO-ALRT system. This is due to the poorer accessability of this station site by municipal transit and the automobile. The Wilson St. station as the only terminal, while providing very good inbound service, has poor automobile access, and requires many patrons to travel to Burlington to access the system with the results previously outlined. This inconvenience and extra travel cost could affect up to one million trips per year.

The lack of an additional station in Hamilton would have serious undesirable consequences for the user of the system. Total system ridership will not be achieved without adequate station facilities.

**The recommended scheme provides the greatest ridership, provides best service in Hamilton, and relieves the downtown area of auto-oriented pressures while still stimulating the area with increased transit travel and other activity.**

Hamilton-Wentworth

Daily Two-Way Ridership

| | Year | Wilson/Hwy 403 Stations | Wilson Station | CNR Station |
|---|---|---|---|---|
| **Table 1** | | | | |
| **Served in Hamilton** | | | | |
| Outbound (AM) | 1991 | 6,530 | 4,560 | 3,700 |
| | 2021 (A) | 8,500 | 5,980 | 4,930 |
| | 2021 (B) | 13,460 | 9,550 | 7,880 |
| Inbound (AM) | 1991 | 4,960 | 4,960 | 3,190 |
| | 2021 (A) | 8,300 | 8,300 | 5,310 |
| | 2021 (B) | 6,040 | 6,040 | 3,880 |
| Total | 1991 | 11,490 | 9,520 | 6,890 |
| | 2021 (A) | **16,800** | 14,280 | 10,240 |
| | 2021 (B) | **19,500** | 15,590 | 11,760 |
| **Table 2** | | | | |
| **Served Outside Hamilton** | | | | |
| Outbound (AM) | 1991 | 1,340 | 3,200 | 3,670 |
| | 2021 (A) | 1,930 } 1 | 4,290 } 1 | 4,900 } 1 |
| | 2021 (B) | 3,050 } | 6,750 } | 7,720 } |

Note 1: Parking facilities at Burlington stations will be strained by these volumes. The higher volumes many not be achievable due to this.

## 12.0 CN-Ferguson Option

**Removal of Bridges**

**The isolation of the community north of the CNR as a result of the removal of bridges, has been identified as an issue.**

During construction of the GO-ALRT system, it would be necessary to remove some bridges and to rebuild them. The removal would be carried out in a sequential manner so that the community will not be totally isolated. Some level of transportation service will be maintained. The bridges that would be rebuilt are Bay, James and John Streets.

The MacNab Street bridge is a different case. It would require removal and reconstruction for GO-ALRT. However, it will eventually have to be removed to allow for construction of the Perimeter Industrial Road. It would not be practical for GO-ALRT to spend the money to replace the bridge and then have the municipality remove the bridge in a few years. It would be more fiscally prudent to remove the bridge at the time of the GO-ALRT construction.

The Mary Street bridge would have to be removed and could not be replaced since the approach fills would require the removal of about 14 houses on Mary St. However, a pedestrian crossing at Mary Street may be possible, to pass over GO-ALRT and C.N.R. tracks. The ramps, as indicated in the attached sketch, would have an 8% grade (necessary for wheelchair access) and be 72 m (236 ft.) long. It would be necessary to remove one house on the north side of Strachan Street for the construction of these ramps. The crossing would be 7 m (23 ft.) above the present grade of Strachan Street.

**Some disruption to access during construction would occur but this would be kept to a minimum by staging. The major impacts would result from the closings of Mary and MacNab Street bridges over the CNR.**

**Edgar Davey School**

**The CN-Ferguson option would pass near Dr. J. Edgar Davey Elementary School. The Hamilton Board of Education has plans to close West Avenue Elementary School and those students involved will be sent to the Edgar Davey School. Students will be required to walk both across and along Ferguson Avenue and individuals have expressed concerns for their safety if the GO-ALRT guideway were located on Ferguson Avenue.**

The design on Ferguson Avenue would locate vehicular traffic on the east side, the CNR track would remain in the middle, the GO-ALRT would be on the west side, and pedestrians could walk under the guideway. There would be no risk of injury to the children walking along Ferguson Avenue, resulting from the GO-ALRT guideway. It is not possible for the students to climb the supports. It is not possible except under emergency circumstances, for individuals to gain access to the guideway and tracks and to be in the path of a GO-ALRT train. At-grade sections of the GO-ALRT will be similarily secured using 1.8 m (6 ft.) high security fences.

**Beasley Park**

**The Ferguson Avenue option would pass diagonally across Beasley Park.**

Much of the land for this park has been purchased by the municipality, although a limited amount of park development has occurred at present. The GO-ALRT would be on an elevated guideway, 5 m (16 ft.) above the ground, and supported by circular columns spaced at about 30 m (100 ft.) apart.

The potential impacts on the park have been reviewed with municipal staff. The plans for development of the park would have to be modified. It may be possible to purchase additional lands adjacent to the park, to replace the area occupied by GO-ALRT. These lands, however, are presently in use.

## Systems Operations

**Some individuals have questioned if the alignment geometry of the Ferguson Ave. option imposed limitations for train frequencies and for future extendability.**

GO-ALRT operations on the Ferguson Avenue option are very restricted due to the geometry of the alignment approaching the terminal. A series of sharp horizontal curves not only require reduced speeds, but require the crossovers that enable trains to switch from one set of tracks to the other, to be placed a considerable distance from the station. Forecasts of transit demands for the year 2021 indicate that trains will need to run 6 minutes apart on the average, and even as low as 4 minutes apart at times. The length of time required to enter, discharge and board passengers, and leave the terminal varies between 3 minutes and 5 minutes depending upon how many tracks are available for use. Since the departure times in Hamilton would need to be fitted into the Lakeshore and North Toronto schedules, trains may need to wait for an opportune time to leave, tieing up one of the tracks. The relatively little flexibility that the geometry permits, would lead to scheduling and capacity problems at a future date. It should be kept in mind that the Yonge Street subway line in Toronto is currently experiencing capacity problems only thirty years after its construction, proving that it is necessary to maintain a long term perspective in transit planning.

When the future easterly extension occurs, the operational difficulties on Ferguson Avenue would become further complicated by the necessary backtracking. As the two tracks on Ferguson would already be utilized to near capacity levels, it would not be possible to increase the volume of trains carried. A third track and a second platform at the station would be required. Furthermore, the Stoney Creek extension would strictly be a shuttle service necessitating a transfer at the Hamilton terminal.

Appendix F includes a more detailed study of systems operations with discussion of both the York Boulevard/Woodbine Tunnel option and the Ferguson Avenue option.

In summary, due to the significantly reduced operational characteristics and the inability to protect for through service to points east of Hamilton, this option is not acceptable.

RB/eb/L:254

GO-ALRT MARY STREET PEDESTRIAN BRIDGE

## 13.0 Natural Environment

**Opinion has been expressed locally that the CNR route would have less of an environmental impact, particularly on the Royal Botanical Gardens, than the options that follow Highway 403 (i.e. York Blvd. option).**

The specific impacts have been reviewed with the RBG. Study information indicates that although care must be exercised to minimize aesthetic impacts on Cootes Paradise, the Highway 403 alternatives creates less of an impact on the natural environment than does the CN/Ferguson options. The Royal Botanical Board and the Hamilton Harbour Commission support this finding. Specific impacts on the natural environment are discussed in the following paragraphs.

Along the recommended route, there is very little impact on vegetation. The nationally rare plants (Hop Tree) on Lilac Point are not anticipated to be affected by the construction of the recommended route. Similarly, no effect is anticipated on the habitat of the avian wildlife. In fact, mammals in the Study Area are not rare or uncommon, and are tolerant of disturbed and urban or suburban conditions such as are found widely in Southern Ontario.

Similarly, there is no significant condition change anticipated to the fisheries resources with this route option.

For the CN-Ferguson option, the natural environmental impacts are more significant compared to the recommended route, even after the mitigating measures are incorporated. There will be significant condition changes in vegetation, related mainly due to the removal of slope stablizing vegetation especially along the edge of Sunfish Pond. In addition, some of the Sassafras and Dryland Blueberry shrubs and Black Walnut trees are likely to be removed during construction. Sassafras shrubs are

regionally rare and both the Dryland Blueberry shrubs and the Black Walnut tree are provincially and nationally rare. These shrubs/trees are located around Snake Road. Additional trees will be removed along Strachan Avenue with the CN-Ferguson option.

Wildlife is affected significantly for the CN-Ferguson option. The Sunfish Pond and Desjardin Canal on the Hamilton Harbour side are sunning areas and breeding grounds for Map Turtles, Painted Turles, Pickerel Frogs and Northern Leopard Frogs. Impacts will be most significant during construction with some mortalities of the species but only moderately significant after construction, as many of the habitats can be restored. It is also possible that the filling of the harbour's edge will remove the fisheries habitat of Pike and Large Mouth Bass.

Some potential changes specific to water quality that are possible with the CN/Ferguson option are:

- reduction of the water surface (area) that will be available for oxygen diffusion.

- increase in the turbidity and suspended solids in the water.

- the deposition and covering of the benthic zone that may eliminate or reduce the bottom living organisms which are part of the food chain.

Although mitigating measures are planned to minimize these impacts, the extended length of construction along the shoreline increases the likelihood of negative impacts occurring.

**Although it is recognized that care must be taken to ensure minimum aesthetic impacts on Cootes Paradise, the Highway 403 route options (York Blvd./Woodbine Tunnel) are considered to have less of a natural environmental impact then CNR route options (Ferguson Ave.), thereby making it the recommended route. The Royal Botanical Gardens and the Hamilton Harbour Commission support this finding.**

RWB/eb/L:247

## 14.0 Kay Drage Park

**Considerable concern has been expressed about potential problem arising from the methane gas that is produced by a landfill site and the impacts on the park itself.**

These concerns are addressed within the following paragraphs.

### Landfill Implications

Preliminary discussions have indicated that constructing a station over a landfill site is a feasible proposition. As an example, a transit station has been recently constructed on a landfill site in Ottawa. Although the depth of landfill is not as great at the Ottawa site, it does prove that there are ways to engineer a solution. In general a means of intercepting the gas, by providing a path of least resistance, will be installed below the parking and station areas. This system could incorporate a porous granular mat, geotextile fabrics and/or piping possibly connected to powered fans to collect and safely remove methane gas from any potential problem areas.

More detailed studies will be undertaken to determine the specific measures that will be used to mitigate the potential problems that may develop. The terms of reference for this study have been prepared and have been approved by the Ministry of the Environment. The study will start as soon as the route recommendation has been endorsed.

### Recreational Implications

Currently, the park is under the jurisdiction of the City of Hamilton Parks and Recreation Department, and is planned to accommodate recreational playing fields. A GO-ALRT station would require use of about 16.5 ac. of the 26 ac. park site. However, space for two playing fields and a buffer area of about 2.5 ac. would be retained, and the potential exists to use about 9 ac. of adjacent unused land. Preliminary discussions have been held with the Diocese of Hamilton in this regard. With the development of a GO-ALRT Station at this location, improved vehicular access and parking facilities will be available to enhance the use of the recreational facilities.

**Princess Point Impacts**

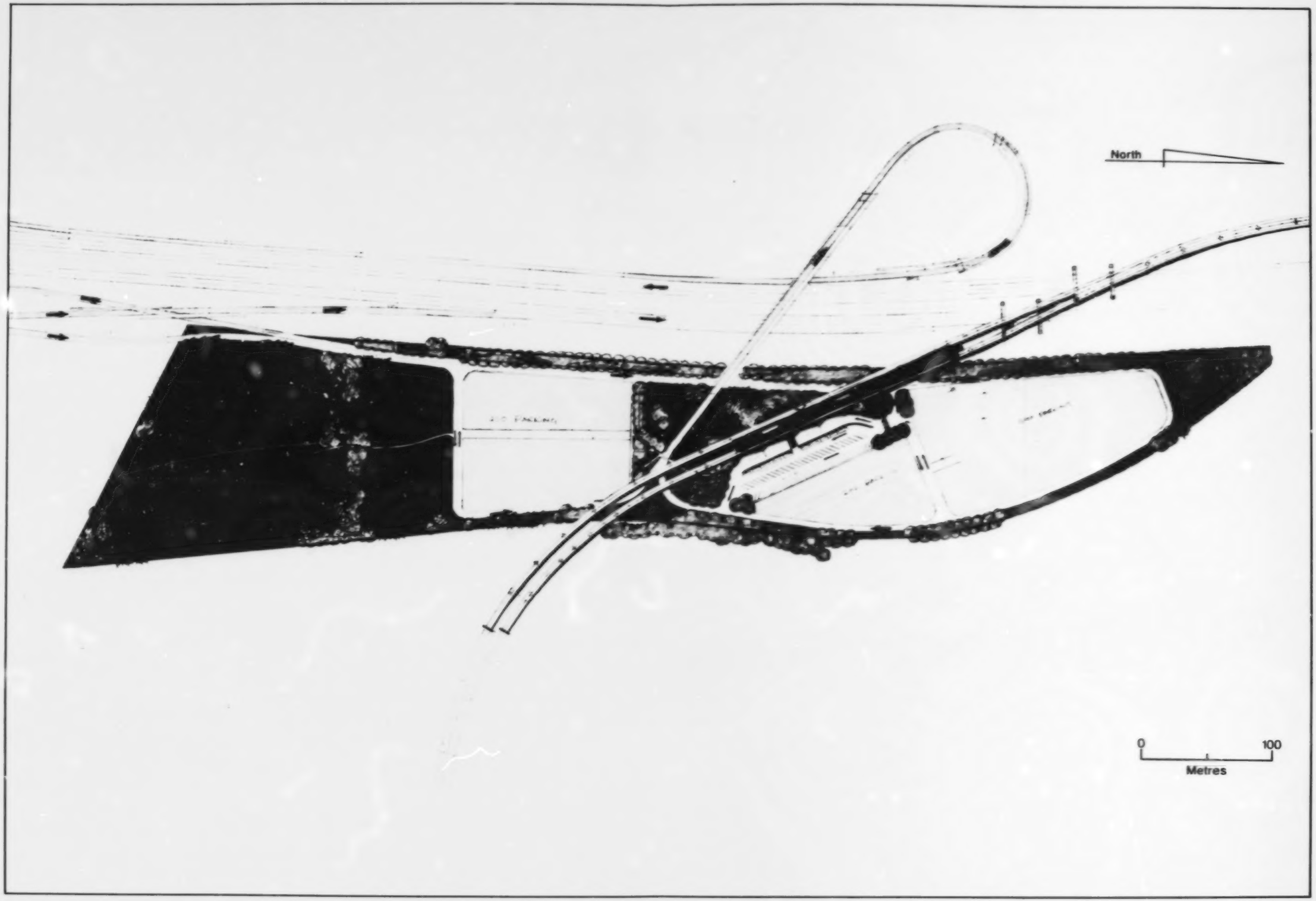
**Some concern has been expressed that the exit ramp from the Highway 403/Macklin Rd. station will impact on Princess Point.**

The preferred concept plan for interchange access from Highway 403 to the proposed line station, includes the construction of an exit loop ramp from the station, passing over Highway 403 and Macklin Road, and occupying a small amount of land owned by RBG. The design does not affect the vehicular access to Princess Point, but construction may impact slightly on the toboggan run. Further meetings are planned with RBG to consider design modifications (which are possible) to best incorporate the requirements of the RBG. An improvement to the toboggan area is a distinct possibility.

Traffic noise from Highway 403 is the dominant source influencing the ambient environment at this location. Noise from the very low speed traffic using the exit ramp, or from GO-ALRT, will not impact on the passive recreation area located at Princess Point, since there is adequate separation of these activities.

Further plans that will be prepared will also include proposals for landscaping and plantings in the area.

**In summary, no significant impacts on Princess Point have been identified. The future design plans will be prepared after consultation with RBG, and they will incorporate features to minimize the identified concerns.**




STATION CONCEPT - HWY 403 / MACKLIN RD.

## 15.0 Hamilton Cemetery

**Strong feelings have been expressed about construction under Hamilton Cemetery. These feelings are understandable and appreciated.**

However, in order to avoid the removal of numerous additional homes, it is proposed to bore a tunnel beneath the Hamilton Cemetery for the recommended route from Hwy. 403 onto York Blvd.

Specifically, the tunnel will be bored for approximately 110 m (360 ft.) to beyond the property limits of the cemetery. Construction will then continue using cut-and-cover methods until the tunnel emerges in the median on York Blvd. Within the area of the cemetery the top of the tunnel excavation is 10 to 12 m (33 to 40 ft.) below the present ground surface. With the graves 1.8 to 2.4 m (6 to 8 ft.) below ground, no disruption to the cemetery or the graves is anticipated. A geotechnical consultant engaged to take soils borings at the site and to make recommendations concerning the tunnelling, has confirmed the feasibility of the proposal. Unlike potential tunnel locations downtown, the tunnel at this location is above the water table.

Discussions have been held with Hamilton Cemetery and with the Cemeteries Branch, Ministry of Consumer and Commercial Relations. Both find the proposal acceptable and there are no legal problems associated with construction of the tunnel.

It should be noted that there are many situations elsewhere where tunnels have been bored under a cemetery. A specific example is in the City of Etobicoke where a 10 foot diameter sanitary sewer between 20 to 30 m (66 to 100 ft.) below ground surface, was bored beneath Park Lawn Cemetery without adverse impacts.

**In summary, it is technically feasible to bore a tunnel under Hamilton Cemetery, without disrupting the cemetery or the graves. To avoid the Cemetery, it would be otherwise necessary to remove many more homes.**

## SOILS INFORMATION

### LEGEND

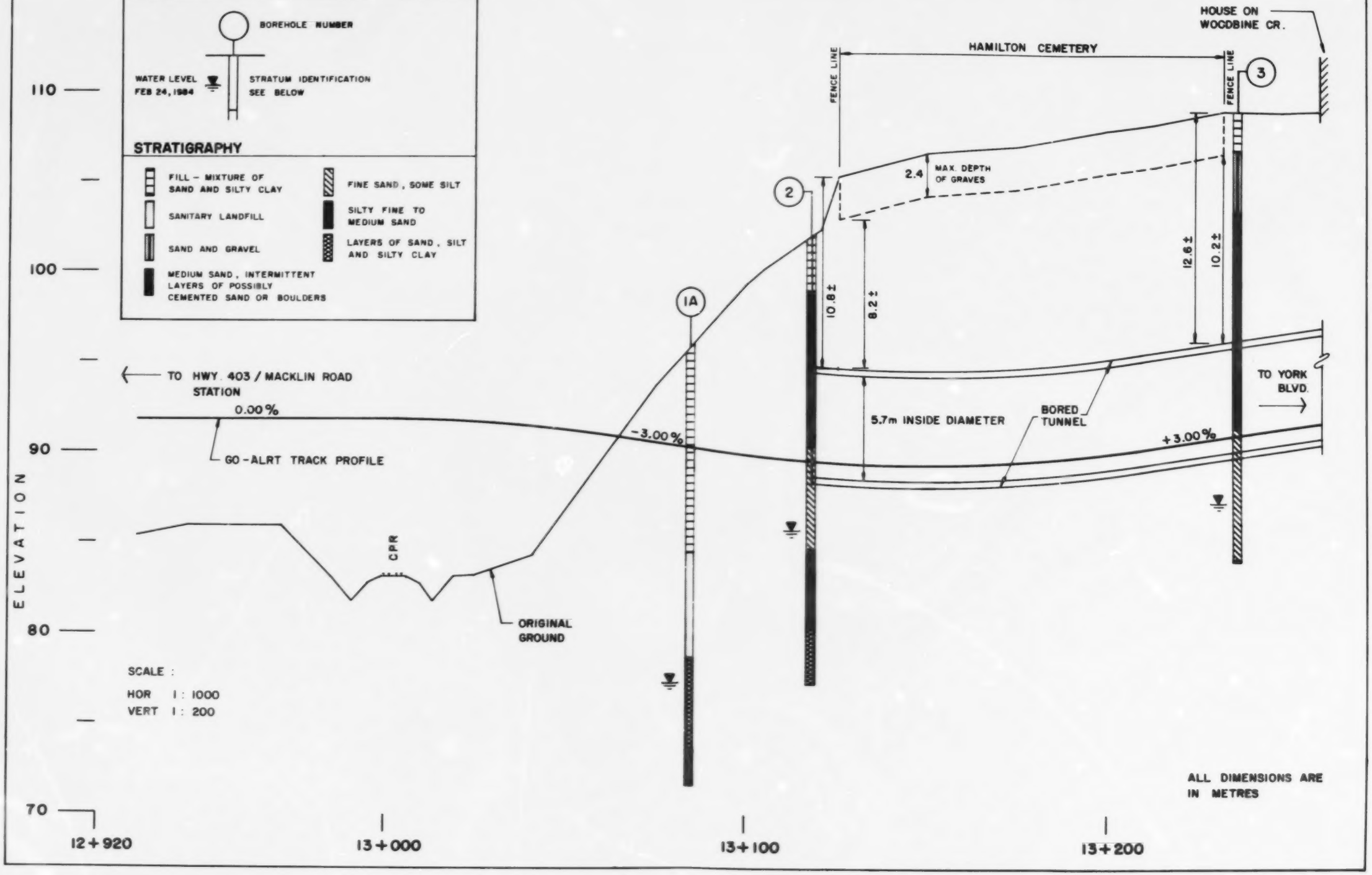
BOREHOLE NUMBER

WATER LEVEL FEB 24, 1984

STRATUM IDENTIFICATION SEE BELOW

### STRATIGRAPHY

- FILL – MIXTURE OF SAND AND SILTY CLAY
- SANITARY LANDFILL
- SAND AND GRAVEL
- MEDIUM SAND, INTERMITTENT LAYERS OF POSSIBLY CEMENTED SAND OR BOULDERS
- FINE SAND, SOME SILT
- SILTY FINE TO MEDIUM SAND
- LAYERS OF SAND, SILT AND SILTY CLAY




PROFILE UNDER HAMILTON CEMETERY

## 16.0 Woodbine Crescent/Property Acquisition Process

**Some concern has been expressed by residents as to what property will be required, when the acquisition would take place, and what the procedure would be for its acquisition.**

Construction of the GO-ALRT system on this alignment will necessitate the purchase of eleven homes on the north side of Woodbine Crescent. The service station at the corner of Woodbine Crescent and York Boulevard will also be affected, although this may involve the purchase of part of the property only. Once GO-ALRT construction in this area is complete, the area is proposed to be landscaped and remain as an open space area. The sketch following depicts what the area may look like after construction.

The property acquisition process cannot be started until environmental approval is obtained, as required under the Environmental Assessment Act. Both GO-ALRT and the municipality are concerned about the displacment of individuals and businesses. Municipal officials will be included in the planning process. Together with the Province, they are prepared to assist where possible, in the relocation process.

**Property Acquisition Process**

As part of the planning, design and the property acquisition process, engineering and legal survey information will be required. Prior to entering any property, a representative of the Surveys or Property Office will contact the property owners to request permission to enter.

In the unlikely event that any damage should occur to a property, it will be recorded by the individual responsible for the damage and reported to the Property Section, who will investigate the matter. Once the investigation is completed, owners will be compensated for any damage to their property which is attributable to GO-ALRT or their representatives.

Once property requirements are known, an appraisal report will be completed by GO-ALRT to estimate the market value of the property required, based on what the land might be expected to realize if sold on the open market. In the less usual case of the acquisition of only part of a property, the affect this may have on the rest of the property has to be taken into consideration. If a property is further reduced in value, due to changes in size, shape, potential use or affect on buildings, this amount is added to the market value of the purchased portion in the total offer of compensation.

There is also a provision for payment of other allowances, such as reasonable legal and survey costs, relocation costs and inconvenience. Reasonable appraisal costs are also considered under most circumstances. These costs are paid upon the completion of the transaction.

Once the appraisal is completed, a representative of the Property Section will call on the owners to review the appraisal and discuss the purchase. In most cases, an agreement can be reached at this time.

In the event that a property owner disagrees with the need to acquire a property, The Expropriations Act provides for a Hearing to review whether the taking of the land is fair, sound and reasonably necessary for the project to go ahead.

If there is no request for a Hearing, none is held. If there is a request, an Inquiry Officer is appointed. He notifies GO-ALRT and all owners who requested a Hearing, of the time and place it will be held.

At the Hearing, GO-ALRT will outline its need for the property through a presentation. The owner, or his representative, presents the argument against the taking. Both sides are allowed to cross examine.

At the end, the Inquiry Officer submits a report to the Minister summarizing all of the facts and giving his recommendations. Owners will be advised of the decision, usually within 4 to 6 weeks of the Hearing.

The Expropriations Act also sets out the owners rights to compensation and rights to reasonable costs to contest compensation for land under expropriation procedures.

As part of the expropriation process, an owner may request that his case be considered before the Board of Negotiations. This Board was established to conduct informal hearings into compensation matters. Its recommendations for settlement, however, are not binding on either party.

If no agreement can be reached, the Ontario Municipal Board, Land Compensation Office, can be asked to determine the compensation. Its decision is binding, unless appealed by either party, to the Ontario Court of Appeal within six weeks from the date of the Board Order.

In summary, some properties will have to be acquired in order to construct the GO-ALRT. All property owners are afforded the protection of all provisions of The Expropriations Act regardless of whether or not a property is acquired through a property purchase agreement or expropriation. The Act provides the owner with an opportunity to challenge the need to acquire the property initially, and to challenge the compensation offered. The Expropriations Act also makes provision for the payment of reasonable legal and appraisal fees incurred by a property owner as part of his negotiations. Property acquisition is normally concluded sufficiently in advance of construction so that the owner can, if necessary, relocate without being seriously inconvenience.

CONCEPT FOR LANDSCAPING AND PLANTINGS YORK BLVD. / DUNDURN ST.

## 17.0 York Boulevard Elevated Guideway

**Several issues have been raised relative to the elevated guideway portion of the York Boulevard/Woodbine Tunnel route.**

### General Description and Visual Conditions

The elevated guideway would extend from west of Locke Street to the downtown terminal station on the south side of Wilson St. It would be located in the median on York Blvd. west of Queen Street. East of Queen Street, it would be located along the north side of the inbound lanes of York Blvd. West of Bay Street it would be on a new right-of-way north of York Blvd. to James Street N., and then on the south side of Wilson Street, west of James Street N.

The guideway would be constructed of either concrete or steel, supported on single 1.2 m (4 ft.) diameter concrete columns located about 30 m (100 ft.) apart. The width would be about 1 m (3 ft.) narrower then the median on York Blvd., and would be elevated about 5 m (16 ft.) above the ground surface. It would be of modern design similar to but narrower than many newer highway bridges visible throughout the Province.

The design of elevated structures has changed drastically since those originally constructed in Chicago and New York at the turn of the century. Engineering advances have resulted in more efficient designs for the structures. The lighter weight vehicles further reduces the design requirements. Today, the structures are more aesthetically pleasing, are as unobtrusive as possible, and can be compatible with the urban environment. Elevated structures of this type have been accepted and built in Vancouver, Scarborough, Atlanta and Miami and accedpted in Oshawa, Oakville, Burlington and Detroit to name but a few.

The very unsightly appearance of some of the older style structures, such as the Gardiner Expressway, should be avoided as should the disruptive restoration program. As is demonstrated by several of the 20-year old structures on some of Ontario's freeways, visual

deterioration of modern design structures has not occurred. Certainly in the case of GO-ALRT, because there is not a need to use deicing chemicals, the visual qualities of the structures should be retained for a great number of years.

**Loss of Privacy**

The passengers in the GO-ALRT vehicles would be about 9 m (30 ft.) above the ground, and some concern has been expressed that adjacent residential areas may loose their privacy. The York Blvd. frontage is designated for commercial development, and residential areas are more distant from the guideway. In the interim years before the full frontage of York Blvd. is developed, some rear yards may be visible from the GO-ALRT, but due to the distance this is not expected to be of serious concern.

**Traffic Hazard**

It is common in urban areas, to see structures close to traffic lanes. Examples of these are the column supports on the recently reconstructed Burlington Street, utility poles, signs, trees and building structures which line many streets. The columns for the guideway would not be a traffic hazard. In fact, they are further away from the travelled roadway than many of the others mentioned above and are in excess of engineering safety standards.

**Plans for Landscaping**

The elevated guideway would modify the existing landscape. The plans will include for the planting of trees and shrubs in the median. In the area of Sir John A. MacDonald School, plantings are also planned to compliment the present landscaped grounds of the school. Sunlight will reach the area of plantings most of the time. Adequate watering of the plants will have to be assured.

The plans to be prepared for plantings, street furniture, etc. along York Blvd. would be reviewed with the Municpal TAC to ensure compatability with other municipal initiatives. In this regard, a landscape architect is part of the GO-ALRT Project Team, and his advise will assist TAC in their review. The plans would consider special treatment to the ground surface and to the underside of the guideway structure, if deemed necessary. The new street lighting may be best accomplished by direct attachment to the elevated guideway.

**Interference During Construction**

During construction, the contractor would be required to occupy only the median lanes of York Blvd., progressing along the street to construct the footings, columns, and then the guideway itself. This type of construction progresses rapidly, and lane blockages are not expected to last for extended periods. Little disturbance is expected to vehicular and pedestrian travel along York Blvd. or on cross streets.

After construction with the exception of the left turn access to Kinnell St., all present vehicular and pedestrian movements would be retained so that there would not be any significant physical disruption to existing community intra-actions. Psychologically, the guideway is not expected to be a barrier, since it would be only one part of the wide roadway that presently exists in the corridor.

**York Blvd. Development Guidelines**

In 1979, Hamilton Council approved guidelines to control development on York Blvd. west of Bay St. It is suggested that an elevated GO-ALRT guideway would not be compatable with these guidelines.

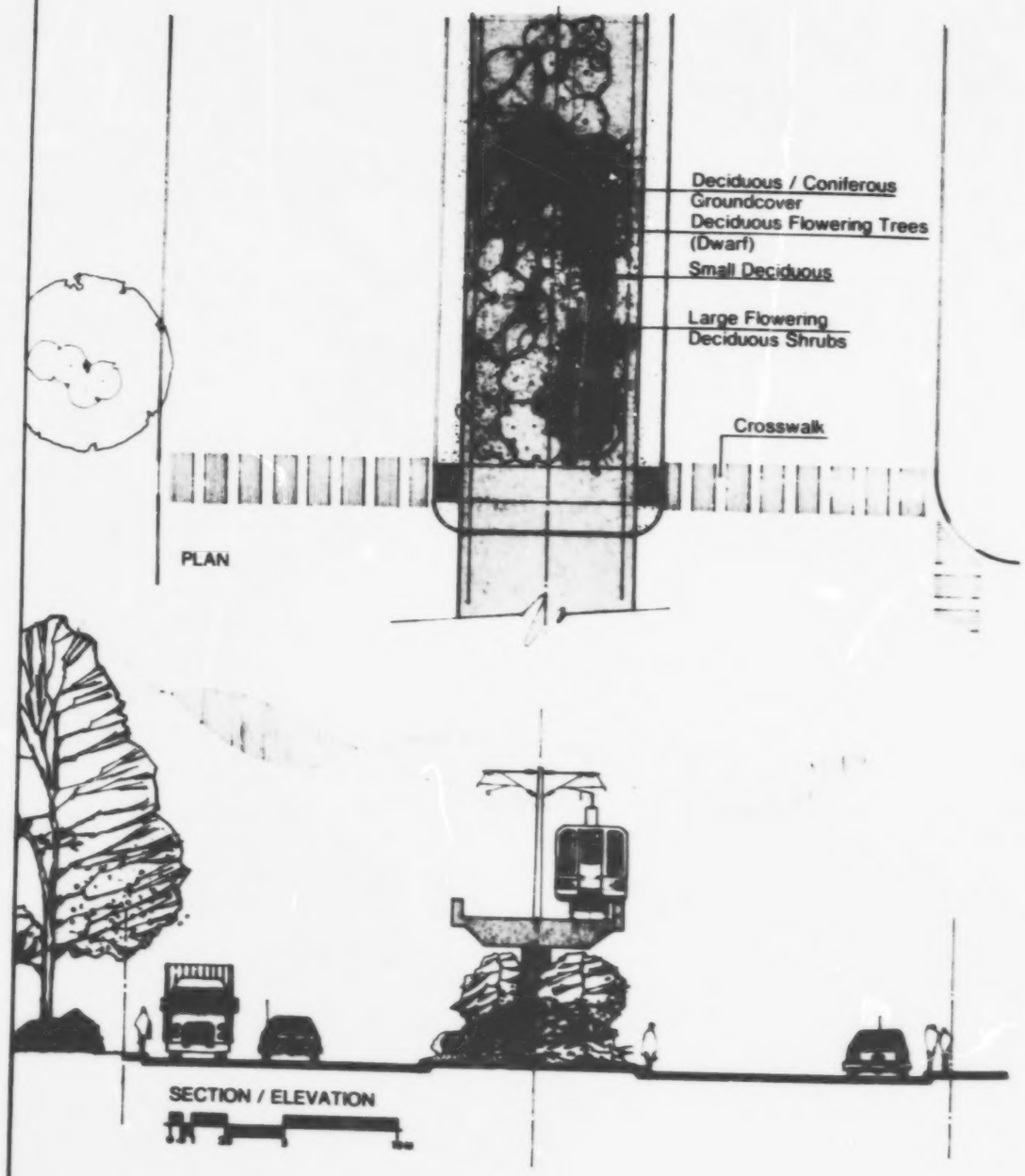
It must be acknowledged, that the development guidelines approved in 1979, did not contemplate an inter-regional rapid transit system serving Hamilton. Therefore, specific reference to transit is not included in the guidelines.

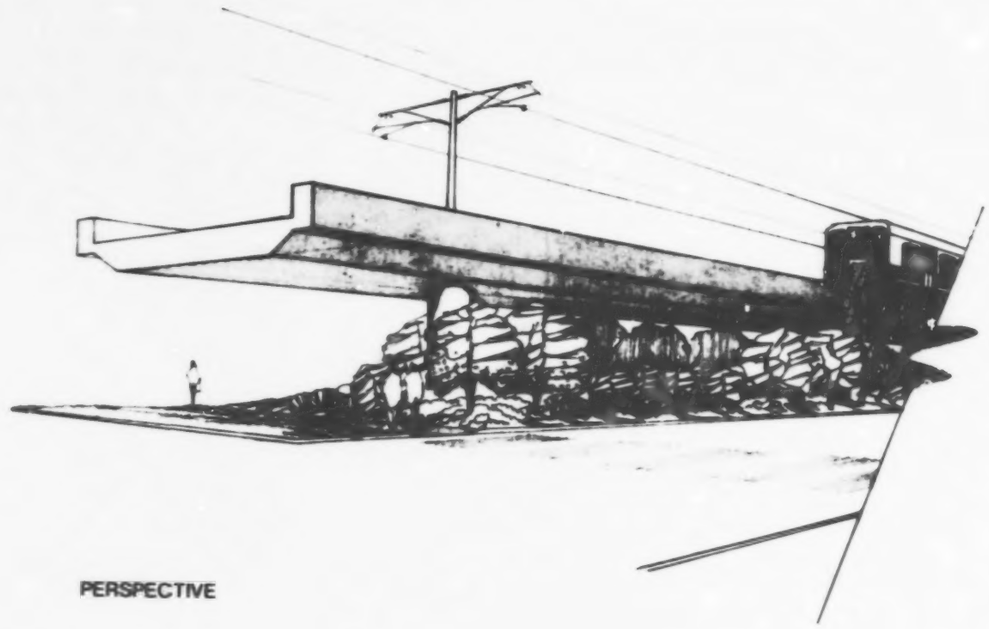
The guidelines refer to York Blvd. as a regional entrance to the City, serving both pedestrians and cars. The guideway would not interfere with vehicular and pedestrian movements, and would increase travel volumes on the street without causing an increase in traffic volumes.

The buildings on the street must be 10-85 ft. high and must provide for a 10-foot wide, covered pedestrian way. The building mass must be proportional to the street right-of-way, and must permit sufficient light access to the Boulevard. The guideway would be about 24 ft. wide and the side parapets will be about 24 ft. above the ground. These dimensions, within the 120 ft. wide right-of-way, appear to be proportional to the dimensions of other structures. Since the street has an east-west orientation, sunlight on the median ground surface should occur about 90% of the time. Sidewalks and roadways surfaces will be open to the sky as they are to day.

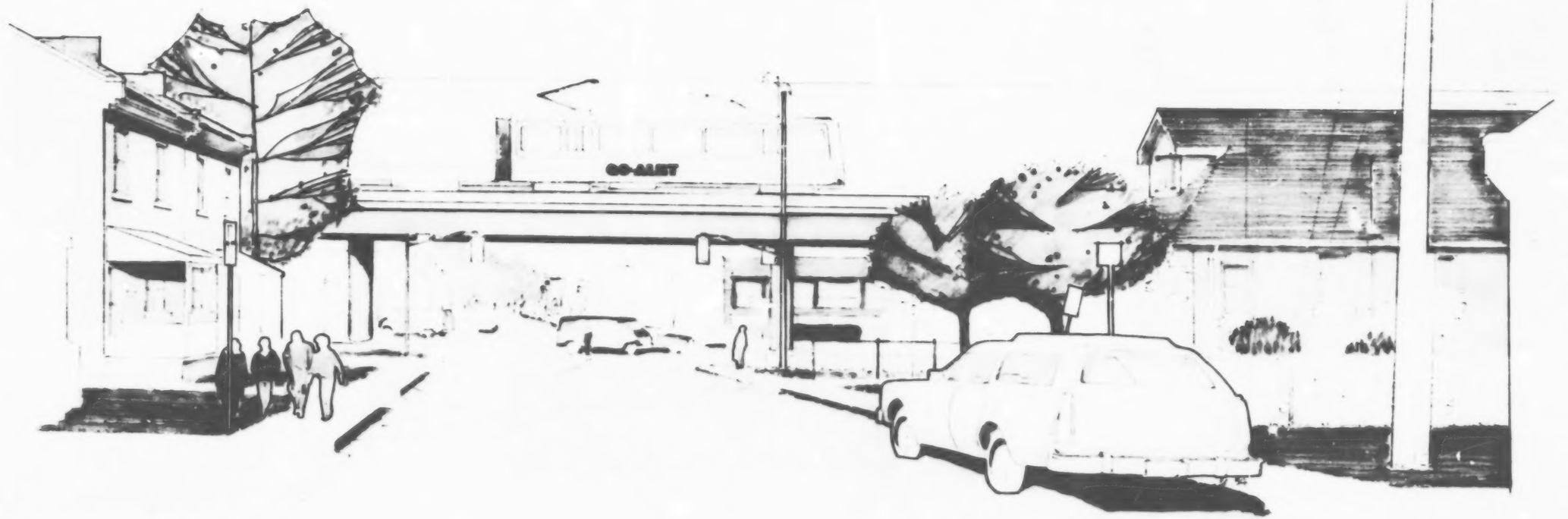
The guidelines further suggest that there should not be any interference with market forces, and architectural controls should not be imposed. The GO-ALRT will not interfere with travel along York Blvd. and should not interfere with existing market forces. In fact, any development wanting visual exposure, would benefit from GO-ALRT. The modern design of the GO-ALRT structure would be compatible with the new buildings constructed on the street.

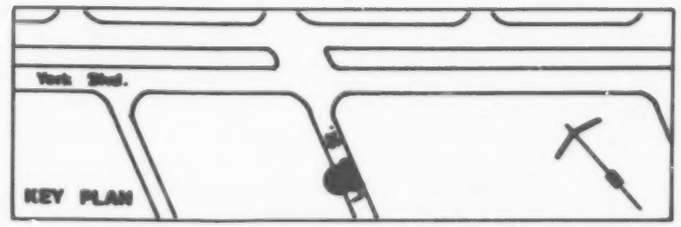
In summary, it is obvious that there would be a change in the conditions along York Blvd. These would be primarily visual changes, and individuals will differ in their concepts of the significance of these changes. Modern design and construction methods would be used, to minimize any adverse condition change caused by the guideway. The guidway will not look like the years-old structures in Chicago and New York, but will incorporate the positive features of elevated guideways in such places as Scarborough, Vancouver, Washington, Atlanta and Miami. These modern day structures do not display visual decay as did many older structures.



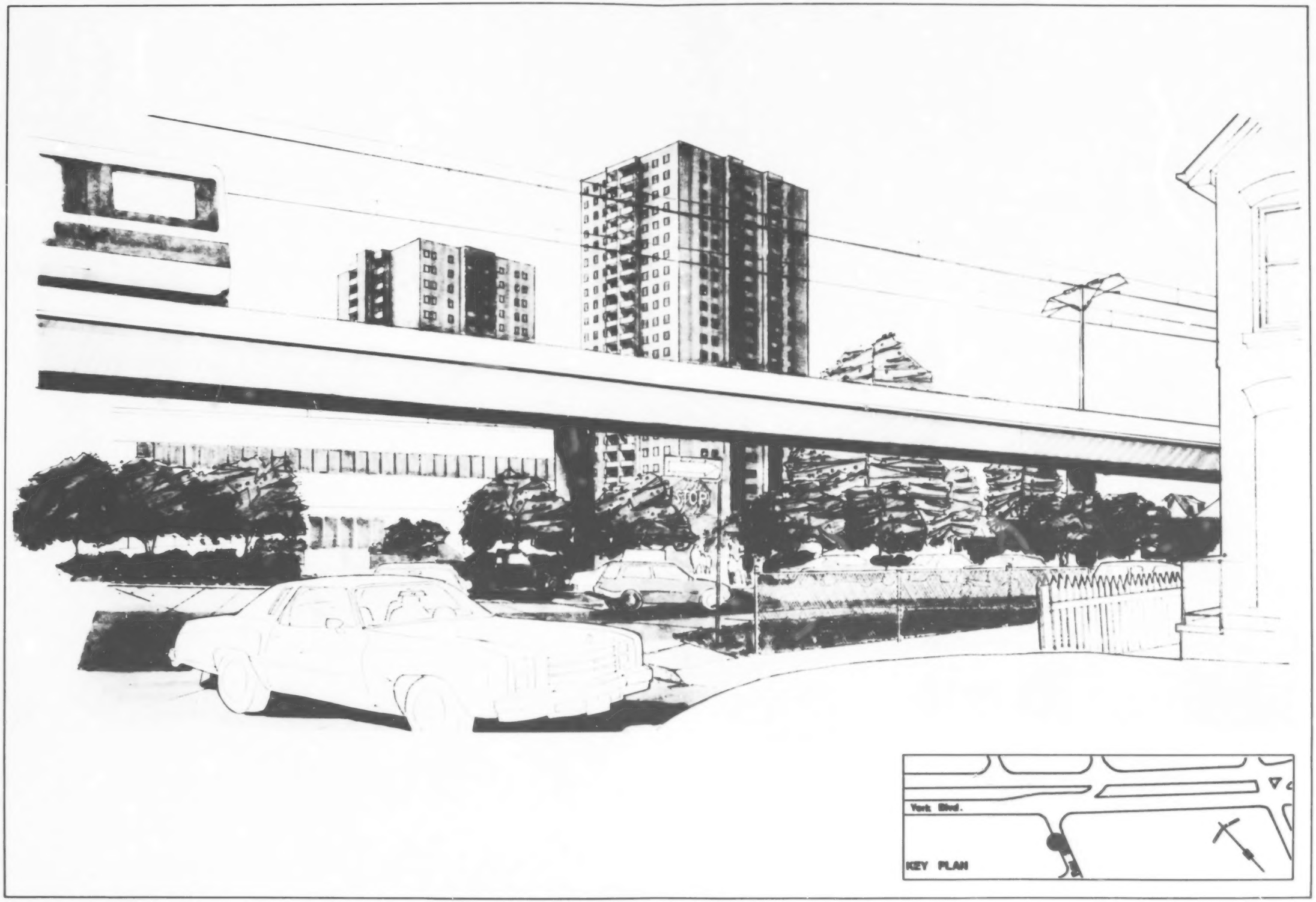




CONCEPT FOR PLANTINGS ON YORK BLVD




YORK BLVD. AND LOCKE ST. LOOKING NORTH




YORK BLVD. AND RAY ST. LOOKING NORTH

## 18.0 Downtown Property Impacts

**A new right-of-way is required for the recommended route, easterly from Hess St. and it is claimed that property impacts will be severe.**

There are property impacts in the downtown area. These are limited but may be severe to those involved. Every effort will be made to properly identify and reduce the effects of the impacts. To this end, the design for the GO-ALRT System easterly from Hess St. will be refined, and this further study will involve the affected property owners. During discussions with these owners, municipal officials will be involved so that necessary municipal committments can be included as part of the plans. This would be of particular importance if the present land use controls caused limitations for the continued use of the property by the land owner.

Further design work will include mitigative measures to ameliorate any identified negative impacts. For example, in the case of noise and vibration impacts, further study to determine the specific mitigative measures is required. These could consist of noise barriers, resilient track mountings, enclosure of the guideway, and the reglazing of windows.

More specifically, in dealing with the individual properties, the following is noted:

**Sir John A. MacDonald School**

The GO-ALRT guideway would traverse the triangular portion of school property near the corner of York and Bay, passing some 7-8 m (23-26 ft.) from the solid south facing red brick school wall. The guideway would be visible from the east and west sides of the school, and there would be marginal encroachment on a corner of the end zone of the football field near Hess Street. There would be no disruption to the pedestrian access to the school along the footpaths on the south side of the school. After construction outdoor noise levels would increase

somewhat, but indoor noise levels would not change. Vibration impacts are not expected to be of concern. New planting can be installed to reduce any visual impacts.

**Salvation Army**

The guideway would necessitate the partial removal of two Salvation Army warehouse structures, used to collect and distribute second hand clothing and furniture. The dormitory, just south of the route, would remain in place. It might be possible to reconstruct vertically at this site to compensate for the loss of the two warehouses. Noise impacts could affect the use of the dormitory after construction, but mitigating measures could be incorporated to ameliorate this impact.

**Philpott Memorial Church**

The guideway would pass immediately north (behind) Philpott Memorial Church, and require the removal of the Campbell Glass building (owned by Philpott). The existing and proposed parking facilities for the church would be virtually unaffected. Expansion, to house church related facilities, if it were to occur, would have to be in a separate building but a connecting passageway to the main building is possible. Outdoor noise levels at the rear of the church, adjacent to the offices, meeting rooms, class rooms etc. would increase, and mitigating measures to reduce these levels could be incorporated. Of more importance, the noise levels adjacent to the sanctuary would be similar to those created by traffic on York Blvd. and therefore the interior noise levels are not expected to change discernably. Vibration impacts are not expected to be of concern. It is further noted, that the times of peak usage of GO-ALRT will not coincide with the periods when services are conducted by the church, or during other church activities, many of which occur in the evenings. The view from the main entrance of the church (facing east) would not be directly affected by the guideway.

**G.S. Dunn & Co. Ltd.**

The modern building would be avoided, but the older 4-storey portion of the building used to mill mustard, would have to be removed. A replacement structure might possibly be built on adjacent vacant land, and discussions would be held with G.S. Dunn in this regard.

**Cambridge Clothes (Commercial Block)**

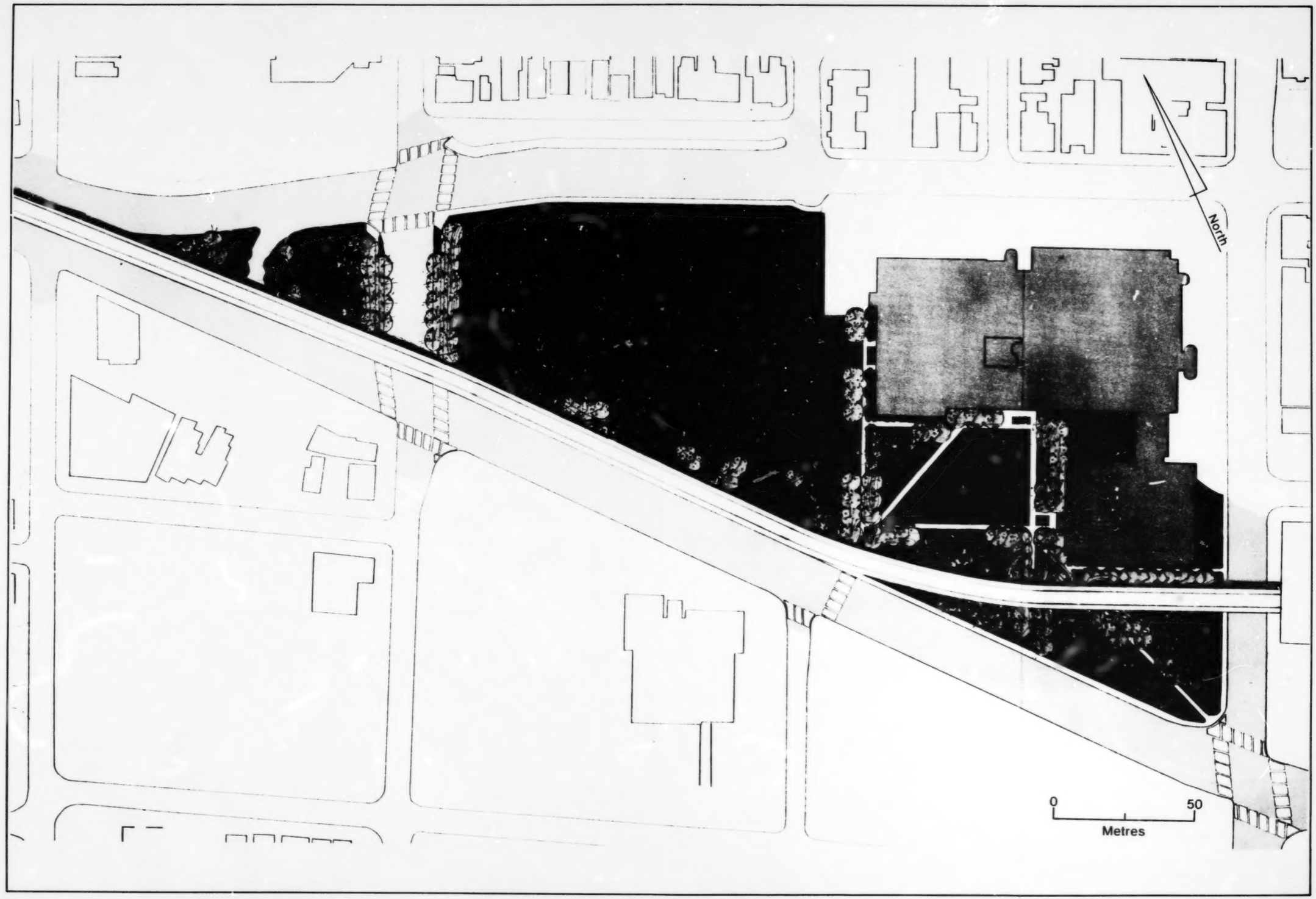
The GO-ALRT guideway would be located about 15 m (50 ft.) north of the Cambridge Clothes building. Noise and vibration impacts are not expected to be a problem.

**Dobson Block**

This is a terrace of 5 buildings which form part of the potential James Street North Heritage District. At least 3 of the 5 buildings would have to be removed in order to construct the guideway. A study of this Heritage District is just starting, and GO-ALRT will work closely with the study to facilitate the achievement of the objectives of Hamilton. Although there are other more important buildings that would remain, the Dobson Block, which provides part of the continuity of the James North streetscape, would be lost.

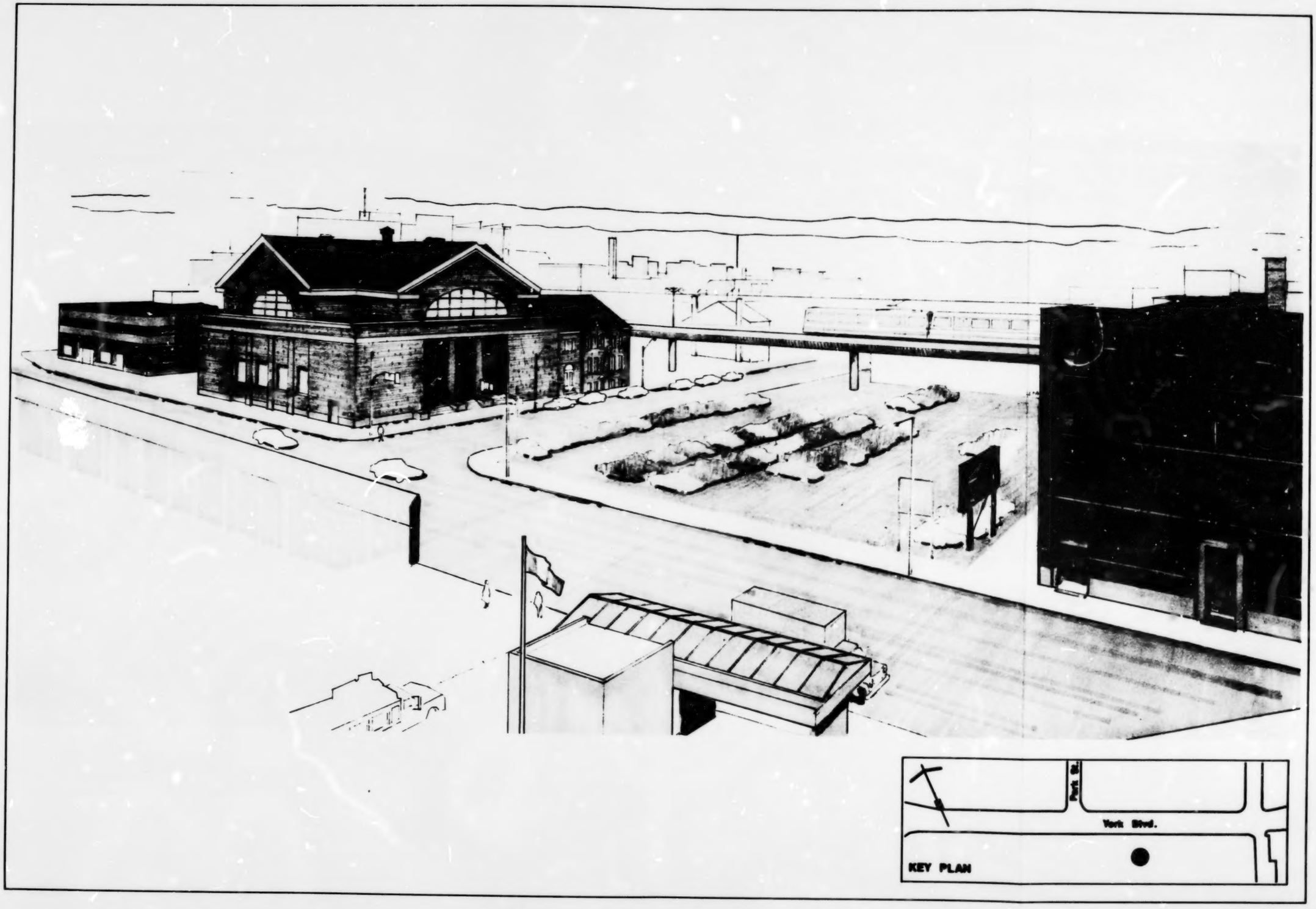
**Commerical Buildings**

The grouping of commercial buildings on the south side of Wilson Avenue, east of James Street N., would require removal to construct the station facilities. Discussions would be held sufficiently in advance of their removal, to allow these businesses to relocate in the area.

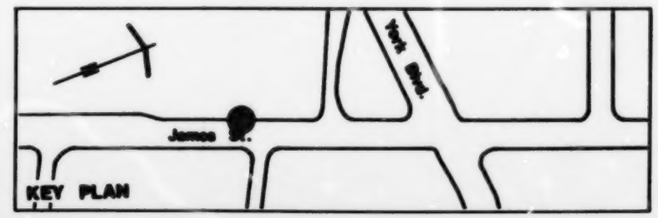



CONCEPT FOR LANDSCAPING AND PLANTINGS YORK BLVD. / SIR J.A. MACDONALD HIGH SCHOOL

YORK BLVD. AND BAY ST. LOOKING NORTH-WEST




YORK BLVD. AT PARK ST. VIEW FROM LIBRARY




JAMES ST. AT REBECCA ST. LOOKING NORTH

URBAN DOCUMENTATION CENTRE
RESEARCH UNIT FOR URBAN STUDIES
McMASTER UNIVERSITY
HAMILTON, ONTARIO

## 19.0 Downtown Inter-Modal Bus Terminal/City Link Express Bus

**Some individuals have asked as to the status of the proposed new bus terminal and they have also asked if the City Link Express Bus service will be discontinued.**

### Bus Terminal

Prior to GO-ALRT, it was planned to build a new downtown bus terminal to replace the Rebecca Street terminal. This plan was placed on hold pending the completion of the GO-ALRT study.

As part of the detailed plans to be prepared for the Wilson Street station, facilities would be included for inter-regional bus service. Construction of these facilities is expected to occur at the same time as construction of the GO-ALRT station.

### City Link Express Bus

It is recognized that the City Link Express Bus provides an excellent service. No committment has been made at this time to discontinue this service. In fact, the committment is to review that service at the time of initiating the GO-ALRT, to determine the overall level of service that would be appropriate.

**Further studies will be carried out to include the bus intermodal facilities at the Wilson Station. Decision on the City Link Express Bus service will be only made at time of implementing GO-ALRT, based on the ridership demands at that time.**

# APPENDIX A

## External Involvement

### Elected Representatives

Municipal Elected Officials were kept fully informed of the status of the project by means of preview presentations of the Public Information centres, and through several presentations and meetings with municipal councils and their various committees. A list of these meetings is set out in part following:

| Date | Purpose |
|---|---|
| March 29, 1983 | Transit Committee of Regional Council<br>Present study design. |
| April 5, 1983 | Special Committee Meeting of Regional Council,<br>Present study design. |
| April 5, 1983 | Regional Council Meeting,<br>Approved study design. |
| June 21, 1983 | Elected Representatives,<br>Preview of route Alternatives |
| August, 1983 | Information Package mailed to each local elected representative including map of all the route alternatives. |
| Nov. 14, 1983 | Township of Flamborough, Planning Committee<br>To discuss the feasibility of a Highway 6 station. |
| Dec. 6, 1983 | Regional Transit Committee/Elected Representatives<br>Discussion of Route Evaluation. |

| | |
|---|---|
| December, 1983 | Evaluation Stage Information Package made available to each local elected representative. |
| Jan. 12, 1984 | Hamilton Parks and Recreation committee, Review evaluation results. |
| Feb. 1, 1984 | Hamilton Planning and Development Committee, Review evaluation results. |
| Feb. 22, 1984 | Hamilton Works Committee, Review evaluation results. |
| Feb. 27, 1984 | Dr. R. Allen, M.P.P. To review evaluation results. |
| Feb. 28, 1984 | Regional Transit Committee, Presentation of "Technical Summary Report, Evaluation Stage" and "Recommendation Report for Route Selection". |
| Mar. 1, 1984 and Mar. 30, 1984 | Downtown Action Plan Implementation Committee (C.A.P.I.C.) To discuss Recommendation Report and respond to questions. |
| Apr. 5, 1984 | Board of Directors, Royal Botanical Gardens, Presentation of recommended route and a review of its impacts on RBG. |

**Public Involvement**

Every effort has been made to identify, contact and work with the community interest groups. This has been done within the regular study framework outlined below, and through several additional specific meetings.

The key dates and events in the public participation program are cited below:

**Study Introduction**

| | |
|---|---|
| May 5, 1983 | Newspaper announcement to inform public of project and upcoming Information Centre. |
| May 12, 1983 | Interest Group Meeting at Hamilton Public Library, (study introduction).<br>- 19 attendees (14 groups) |

**Route Alternatives Stage**

| | |
|---|---|
| June 14 & 15, 1983 | Newspaper announcements to inform public of upcoming Information Centre. |
| June 14, 1983 | Brochures announcing upcoming Public Information Centre distributed by postal walks. |
| June 23 & 28, 1983 | Public Information Centre held at Hamilton Place and Royal Connaught Hotel - 162 Visitors |
| July 5, 1983 | Salvation Army, to discuss implications of alternatives on their facilities on York Blvd. |
| July 6, 1983 | Interest Group Meeting at Hamilton Place, Alternatives Stage.<br>- 26 Attendees (18 Groups) |
| July 26, 1984 | Board of Management, Downtown Hamilton Business Improvement Area, at Royal Connaught Hotel, discussion of alternatives. |
| Sept. 8, 1983 | Hamilton and District Chamber of Commerce, to discuss implications of route alternatives. |

| | |
|---|---|
| Sept. 12, 1983 | Beth Jacob Cemetery, to discuss implications on Cemetery. |
| Sept. 12, 1983 | Downtown Hamilton BIA, with representatives, to receive their appraisal report respecting route alternatives. |
| Oct. 13, 1983 | James St. Terrace Business Association, with a representative, to discuss implications of route alternatives. |
| Oct. 25, 1983 | Hamilton Engineering Week, to public attendees, at open house, as part of other transportation projects displayed. |
| Nov. 9, 1983 | LACAC and other heritage groups, at Hamilton Place, to review identified heritage features, and receive comments concerning the alternatives. |

**Evaluation Stage**

| | |
|---|---|
| Dec. 7 & 14, 1983 | Newspaper announcement to inform public of Information Centre. |
| Dec. 7, 1983 | Brochures announcing upcoming Public Information Centre distributed by a private Hamilton distribution company. Direct mail announcement to non-resident property owners along the route alternatives. |
| Dec. 13, 1983 | Interest Group Meeting at Holiday Inn, Evaluation Stage<br>- 28 Attendees (19 Groups) |
| Dec. 14 & 15, 1983 | Public Information Centre held at Holiday Inn<br>- 158 Visitors |

| | |
|---|---|
| Jan. 4, 1984 | Coalition on Sensible Transit, COST, meeting to review evalation results |
| Jan. 10, 1984 | Hamilton Chamber of Commerce, to review the evaluation results |
| Jan. 24, 1984 | Philpott Memorial Church, Deacon's Board, to review impacts on church, and discuss evaluation results |
| Jan. 24, 1984 | Livingston Furs, to review the evaluation results. |
| Mar. 1, 1984 | Copies of "Technical Summary Report, Evaluation Stage" and "Recommendation for Route Selecticn" submitted to Interest Groups with invitation to attend upcoming Public Drop-In Centre March 22, 1984. |
| Mar. 1, 1984 | Copies of "Technical Summary Report, Evaluation Stage" and "Recommendation for Route Selection" submitted to libraries for public review (Hamilton Public Library, Wentworth Library, McMaster University, Dundas Public Library and the Legislative Library). |
| Mar. 1, 1984 | Newspaper announcement to inform public of Drop-In Centre. |
| Mar. 22, 1984 | Drop-In Centre at Royal Connaught Hotel. - 107 visitors. |
| Mar. 24, 1984 | Social Planning and Research Council Public Forum at Hamilton Place. |

RB/eb/L:257

APPENDIX B

GO-ALRT PROGRAM

HAMILTON PROJECT

## THE URBAN TRANSPORTATION DEVELOPMENT CORPORATION (UTDC)

The major rapid transit strategy for the Toronto centered region, announced in Otober, 1982 by the Minister of Transportation and Communications stated that the project would support and promote Ontario-based transportation technology by implementing a new rapid transit system developed by the Urban Transportation Development Corporation (UTDC is wholly owned by the Government of Ontario). This system, while new, is the result of years of successful product development by UTDC. The following sets out some example of products already available from UTDC.

UTDC developed the Canadian Light Rail Vehicle (CLRV) as a replacement to the streetcars formerly used in Toronto. Since 1978, a total of 196 CLRV's have been supplied to the TTC. These have operated successfully since that time.

More recently, a prototype of an Articulated Light Rail Vehicle (ALRV) was operated in Toronto for a period of 9 months. This program has led to a contract to supply 50 similar ALRV's to Santa Clara, California (final design is underway), and to supply 52 ALRV's to the TTC. With both the CLRV and the ALRV, UTDC is in competition with manufacturers throughout the world, including Bombardier Inc., Quebec. The UTDC has competed for 6 LRV contracts to date, each usually having 6-7 prequalified competitive bidders. UTDC was lowest bid for one contract, second lowest bid for 4 contracts and third bid on the other. The company has proven it can compete in this difficult market.

UTDC has also been active in the development and supply of the Intermediate Capacity Transit System (ICTS) vehicle, the forerunner to the ALRT vehicle. The manufacture of about 151 ICTS vehicles is underway, for supply to Vancouver, Scarborough and Detroit with first

delivery already made to Scarborough. Additional vehicles will be required when these transit systems are extended. The UTDC was the selected lowest bidder in the Detroit competition and this program is well underway. UTDC was also the selected lowest bidder for a major system in Los Angeles, but after tendering, the program was cancelled due to lack of federal funding.

The Advanced Light Rail Transit (ALRT) vehicle to be used in Hamilton, is being modelled after the ICTS vehicle. The design of the vehicle has been tailored specifically to meet the needs of GO-ALRT for implementation in the Hamilton-Toronto-Oshawa corridor. A prototype vehicle is expected to be operating on a "pre-build" test track between Ajax and Whitby in 1986. This will provide adequate time for adjustments and modifications to be made, if required, to the vehicle before production for Hamilton is started.

The ALRT vehicle will be a married pair of cars, 36 metres long with a seating capacity of 124. Trains of 1 to 5 vehicles will operate at 120 km/h and will use SELTRAC Automatic Train Control. The vehicles will be air conditioned and have steerable trucks with rotary electric motors. Power supply will be 25 kV A.C., collected by means of a single, overhead power collector on each vehicle.

The vehicle is a design iteration, with subsystems which have been proven in use elsewhere.

The vehicle structure will be of light weight, extruded aluminum, the same type of structure used for the ICTS. The door control, couplers and air conditioning system conform to standard transit technology.

The power supply and power distribution method is standard transit technology. The technical expertise of CN and CP is being used on a consulting basis in this regard. Vehicle propulsion, using standard rotary electric motors, is very common. There are a number of manufacturers with long experience in supplying this type of propulsion equipment.

Steerable trucks are planned to support the vehicle. These will reduce the amount of wheel squeal on short radius curves. The design has been developed by UTDC and trucks of this type are being used on the ICTS vehicle. Extensive testing of these steerable trucks has been undertaken. They will be fully proven in advance of their use in Hamilton.

The SELTRAC Automatic Train Control system will be used, so that on-board transit personnel can attend to the needs of the passengers instead of having to "drive" the train. The basic control system was developed in Germany in 1968 and it has proven its safety and reliability in a number of actual applications. It is a proven train control system already accepted by conservative transportation operators in other parts of the world. A manufacturing plant has now opened in Canada, and is supplying the control system for the Vancouver and Scarborough ICTS. The same system will be used in Detroit.

In conclusion, UTDC is one of the foremost urban transit developers in the world, and has many contracts in widespread places to show for its innovative ideas. The Hamilton-Wentworth area will be well-served using vehicles designed, developed, tested and manufactured by UTDC.

RWB:eb/L227

April, 1984

APPENDIX C

# GO-ALRT PROGRAM
# HAMILTON PROJECT
# TH&B FEASIBILITY STUDY
# SUMMARY REPORT

## INTRODUCTION

One route alternative to provide GO-ALRT service to downtown Hamilton, contemplated using the 2.25 km TH&B Corridor along Hunter Street from Highway 403 to the TH&B Station east of James Street. The study concluded that this is not a feasible alternative. This report summarizes the study findings which led to this conclusion.

## EXISTING CONDITIONS

The existing TH&B rail line (wholly owned by CP Rail) extends from a "Yee" junction near Highway 403/Dundurn Street. The initial 0.85 km west of Queen Street is basically a single-track facility in a 30 metre wide "cut". The tops of the cut slopes are very close to the rear of the homes on each side. From Queen Street to Park Street, (0.55 km), the rail line is a single track in a tunnel located under Hunter Street. East of the tunnel, the tracks extend to the existing station located between James and John Streets.

The TH&B Station was formerly used for passenger service. Its location appears suitable for providing acceptable GO-ALRT service to downtown Hamilton.

The Hunter Street right-of-way is 20 metres wide and at several locations, residences and low-rise apartment buildings are constructed adjacent to this right-of-way limit. Some high-rise apartments also exist, but these are set back from the street. Right-of-way widening is not feasible.

## DESIGN CRITERIA

The GO-ALRT System will be electrically powered with automatic train control, capable of a top speed of 120 km/h. In the long term, train frequency is expected to be an average 6 minutes during peak periods requiring an exclusive, grade-separate, two-track right-of-way. If scheduling

could be arranged so as to operate GO-ALRT vehicles on tracks shared with TH&B, the TH&B would insist on schedule control of all traffic and their own train crews would have to operate the GO-ALRT vehicles.

The TH&B requires protection for two tracks through the Hunter Street tunnel. They advise that with some relatively minor alterations, two tracks can be installed within the existing tunnel. They argue that as a main line service to Buffalo, and the only service between the Aberdeen Yards and their freight customers, it is not prudent to restrict themselves in perpetuity to a single track operation.

Therefore, the utlimate design requirements must provide for two TH&B tracks and two GO-ALRT tracks.

It might be argued that, notwithstanding the above, this number of tracks is not required initially. Countering this argument is that if underground construction is being contemplated, at any time, it is necessary to construct the ultimate facilit now. It is not reasonable to construct a widening at a later date. In fact, there are strong reservations related to rebuilding the tunnel with only the existing TH&B operation in place. The presence of GO-ALRT as well as the existing TH&B would virtually preclude the later rebuilding of the tunnel to the joint requirements. This would be unacceptable to GO-ALRT, the TH&B and would have severe ramifications to serving the Hamilton travelling public.

RELOCATION OF TH&B

As a mainline service to Buffalo, the TH&B line in this area is vital to the continued operation of the railroad. The elimination of this portion of the TH&B line would, in effect, terminate the railway operation.

To relocate the rail line, it would be necessary for the TH&B to use the CNR Corridor to the north. The TH&B and the CNR compete to provide freight service to heavy industry located in the northern part of the City. If TH&B shared tracks with CNR, they would be subject to scheduling restrictions imposed by CNR (their competitor). If separate TH&B tracks are constructed along the CNR Corridor, the TH&B would experience increased operating costs due to the extra length of travel from the Aberdeen Yards to their industrial customers and/or to the Kinnear Yards, thus placing themselves in a non-competitive position.

No relocation of the TH&B railroad in the area between Highway 403 and Ferguson Avenue is possible.

## DESIGN AND CONSTRUCTION REQUIREMENTS

The alternative for GO-ALRT service would provide two GO-ALRT tracks located north of two TH&B tracks, with GO-ALRT extending to the original passenger platform at the TH&B Station. The combined four-track structure would have an overall width of about 19 metres. At the west end, the GO-ALRT would be tunnelled under Main Street, under the CPR and under Dundurn Street. The existing road structure on Dundurn Street would be reconstructed requiring a closing of Dundurn Street during the construction period.

Within the open cut area and the existing tunnel, the TH&B line would be relocated to the north side, while the new railroad structure is constructed to the south. The TH&B would then operate in the new structure, as construction of the GO-ALRT portion of the structure is completed.

Construction access would be very difficult since access from the side is not possible. Most cross streets would likely be closed during this construction period.

Within the Hunter Street right-of-way, the vertical sidewalls of the excavation would be 9-15 metres high and possible damage to adjacent buildings is a serious concern. In order to provide emergency access to the adjacent properties during the construction period, a temporary roadway would have to be provided above the area of construction, thus further inhibiting construction activities.

The east end of the tunnel would have to extend to MacNab Street with the Hunter Street pavement continuing easterly, elevated to pass over James Street. No access would be possible between James Street and Hunter Street or between MacNab Street and Hunter Street. Hunter Street would be closed during the construction period. Structural modifications to the City Hall parking garage would be required.

## CONCLUSIONS

1. It is not acceptable to the TH&B to abandon their Hunter Street rail corridor, to make it available for use by GO-ALRT.

2. The construction of GO-ALRT along the Hunter Street Corridor is possible, sharing right-of-way with the TH&B, but making provision for two TH&B tracks as part of the design.

3. The alternative for a GO-ALRT route along the TH&B Corridor is undesirable and should not be pursued further because:

   - During construction, it requires the closing of Hunter Street and Dundurn Street; both important traffic arteries.

   - Access to Hunter Street from James Street and from MacNab Street would be discontinued.

   - The design and construction complexities will be extremely difficult with consequential impact or damage to adjaent properties a real possibility.

   - Construction costs, conservatively estimated at $270 Million, are beyond the fiscal capability of the Province.

March, 1984

RWB:sgr/243

HWY 403
DUNDURN ST
LOCKE ST
JACKSON ST
MAIN ST
KING ST
YORK BLVD
QUEEN ST
HUNTER ST
BAY ST
JAMES ST
MAIN ST
JOHN ST
WILSON ST
GO·ALRT
Ministry of Transportation and Communications
Hamilton Project
T.H.&B Station Option
Scale 1:10,000
March 1984

APPENDIX D

GO-ALRT PROGRAM
HAMILTON PROJECT

# FERGUSON AT KING STATION EVALUATION STUDY

## INTRODUCTION

The evaluation process used for the GO-ALRT Study was a four phase process that concluded with a recommendation, submitted under date of February 22, 1984, that the York Boulevard/Woodbine Tunnel Option be selected for service into Hamilton. Early in this evaluation process, an alternative with a station on Ferguson Avenue at King Street was studied and discarded.

This report reviews the evaluation, by considering the Ferguson Avenue Route Option to a station on Ferguson Avenue at King Street as compared to a station on the south side of Wilson Street (see attached plan).

## DESCRIPTION OF ALTERNATIVES

Both alternatives consist of an elevated guideway along Ferguson Avenue. The alternative to an elevated station on the south side of Wilson Street requires a new right-of-way westerly from Ferguson Avenue.

A station on Ferguson Avenue should be located to straddle King Street and Main Street. This is necessary in order to provide an adequate interface with east-west municipal transit routes. A station at this location requires the acquisition of property on the extension of Ferguson Avenue to south of Jackson Street.

## EVALUATION

The evaluation compares the routes from a common point on Ferguson Avenue just north of Cannon Street to the terminal stations - Ferguson-King versus the south side of Wilson Street.

**Service to the Public** is better with the alternative to the Wilson Station.

The elevated guideway along the west side of Ferguson Avenue to the King Street Station would pass very close to Edgar Davey School and other buildings on the west side of the street. The guideway at this

location will seriously compromise the ability of the Fire Department to provide fire protection to these properties, since aerial ladders cannot be erected on the Ferguson Avenue frontage. Properties on the east side of Ferguson Avenue would be marginally impacted for fire protection. The alternative to the Wilson Station does not restrict fire protection access to properties to any great extent.

Notwithstanding the safety precautions that will be maintained throughout the system, it has been suggested that the locating of an elevated transit guideway adjacent to a rail line is not an ideal condition when one considers that there is some transportation of dangerous goods on the rail line. To extend the Ferguson Route to a station at King Street would increase the "length of exposure" to the rail line. As well, the area of greatest risk for an accident to occur is in the King-Main area where vehicular traffic volumes are greatest. The locating of a station in this area is not recommended for this reason.

The terminal station must serve potential riders generated by existing development. Several surveys indicate that the maximum walking distance for the majority of transit riders is 600 metres. Existing office commercial properties are the main generator of transit riders and it is noted that all of these west of James Street are located more than 600 metres from the Ferguson-King Station. The employment population in the area bounded by James-Bay-TH&B-York is estimated to be 8,600, and includes such major employment centres as Stelco Tower, City Hall, Jackson Square and the Ellen Fairclough Building. The estimated employment population within 600 metres of the Ferguson-King Station is 9,500, while there are 18,300 employees within 600 metres of the Wilson Station.

In addition to office commercial, there are other "non-employment" traffic generators in the area. The total identified is eleven, all of which are within 600 metres of the Wilson Station. For the Ferguson-King Station, only three are within 600 metres (Holiday Inn, Royal Connaught, and King Street East commercial), while the remainder are more remote (Arena, Convention Centre, Hamilton Place, Eatons, Robinsons, Jackson Square, Pigott Building and Sheraton Hotel).

When considering transit access to the station alternatives, service to the Wilson Station is assessed to be better. This station can be served very well with the mountain routes while the east-west routes provide reasonable service (maximum 450 metres walking to the Main Street leg). It is possible to modify some of these routes and to provide direct on-site transit interface at the Wilson Station. For the Ferguson-King Station however, only the east-west routes (1, 3, 4 and 5) provide good service to the station. Most other routes, including the mountain routes are quite far away, with the James Street leg of the routes more than 600 metres distant.

When considering possible interface with regional bus services, the present bus terminal on Rebecca Street is more convenient to the Wilson Station than to the Ferguson-King Station. In the future, if a new bus terminal is constructed, there is more opportunity to construct an integrated facility at Wilson Street than at the Ferguson-King site.

**Social/Cultural Environmental** impacts are judged to be slightly worse for the alternative to the Ferguson-King Station. It dislocates a few more employees (57 versus 33), and there are considerably more residences along Ferguson Avenue that will experience increased noise impacts.

**Natural Environmental** impacts are insignificant and of little difference.

**Land Use Development** considerations favour the Wilson Station site. Both the Wilson Street and Ferguson- King Stations have the potential to effect existing and future land use. The range and nature of land use impacts that can be generated by these stations is reviewed in the following paragraphs.

Accessibility Gains

The Ferguson-King Station would provide a stimulus to existing businesses in the immediate area by focusing traffic on the area and increasing the market exposure of surrounding retail establishments. The Wilson Street Station would also provide a focusing effect but the relative impact on existing local business would be somewhat less than in the area of Ferguson Avenue because fewer businesses are located immediately adjacent to the station.

Nuisance Effects

The proposed GO-ALRT system will be designed to keep nuisance effects of light and noise to a minimum and therefore potential impacts especially in the downtown environment, which is already subject to automobile lights and noise, will be relatively insignificant.

Impacts on adjacent land uses from noise and lights are considered equal for both alternatives although the very close proximity of existing land uses to the Ferguson-King Station might make it slightly more susceptable than the Wilson Street Station.

With respect to visual impacts, the Ferguson-King Station would generate a more significant effect due to the fact it penetrates an already built up streetscape, whereas the Wilson Street Station would be built on vacant land.

Loss of Improvements/Amenities

The Ferguson-King alternative would displace 8 buildings and a few small parking lots. The Wilson Avenue alternative would displace 5 commercial buildings, and 9 residences, one of which is already vacant. It would also occupy land currently devoted to parking but these are general parking areas which are not critical to any one adjacent land use. In addition, in the area of the Wilson Street Station, there are substantial opportunities for parking elsewhere in the immediate vicintiy. The alternative parking opportunities in the area of the Ferguson Street Station are much more restricted.

Based on the above, the loss of amenities was judged to be greater in the case of the Ferguson-King alternative, but more direct property impacts occur with the Wilson Street alternative.

Development

The Wilson Street Station was deemed to have the potential to generate a greater amount of new development than the Ferguson-King Station. The rationale behind this judgement was based on the observations that:

* The very substantial quantity of vacant land surrounding the Wilson Street Station would facilitate major new development more readily than the more densely occupied area surrounding the Ferguson-King Station.

* The institutional and economic hub of the City is focused on the Jackson Square area. This area could be easily integrated with the Wilson Street Station whereas it would be much more difficult to integrate it with the Ferguson Avenue location.

* Given the fact that major new land use developments prefer to locate in close proximity to one another, the readily developable lands around the Wilson Station are in much closer proximity to Jackson Square than the developable lands surrounding the Ferguson Avenue location.

* The Wilson Street Station presents greater overall development flexibility than the Ferguson-King Station. Not only can it be easily integrated with the major commercial and economic hub of the City, it can also be connected with the existing commercial areas east of James Street. The Ferguson-King Station does not present the same flexibility.

* The timing for major new development would likely be shorter in the case of the Wilson Street Station than in the case of the Ferguson-King Station. The combination of economic forces, readily available vacant land and lower conversion costs, make the Wilson area a safer development risk and therefore more likely to "take off" in the short term. The Ferguson Avenue area is a higher risk area and therefore has development potential that would likely only be realized over a much longer time period.

**System Design** considerations favour the route alternative to a station at Ferguson-King. The differences in this regard primarily relate to system operations (service and extendability) rather than to other indicators of this factor.

In the case of the alternative to the Wilson Station, the alignment geometry dictates that the cross-overs required to turn-back trains cannot be located close to the station. With the tangent approach to the station at King Street, this is not a problem, and cross-overs can be located in advance of the station. This will allow frequent train service as may be required in the future.

If the system is extended easterly in the future, this can be done efficiently from the Ferguson-King Station, provided such extension is continued along the TH&B Corridor. However, the preferred corridor for extension to the east is along the CNR. If this corridor is selected in the future, then both alternatives are equally as unattractive, as discussed in the February 22, 1984 Recommendation Report.

**Cost** is not a factor in comparing these alternatives, since it is estimated to be about the same for both.

## CONCLUSIONS

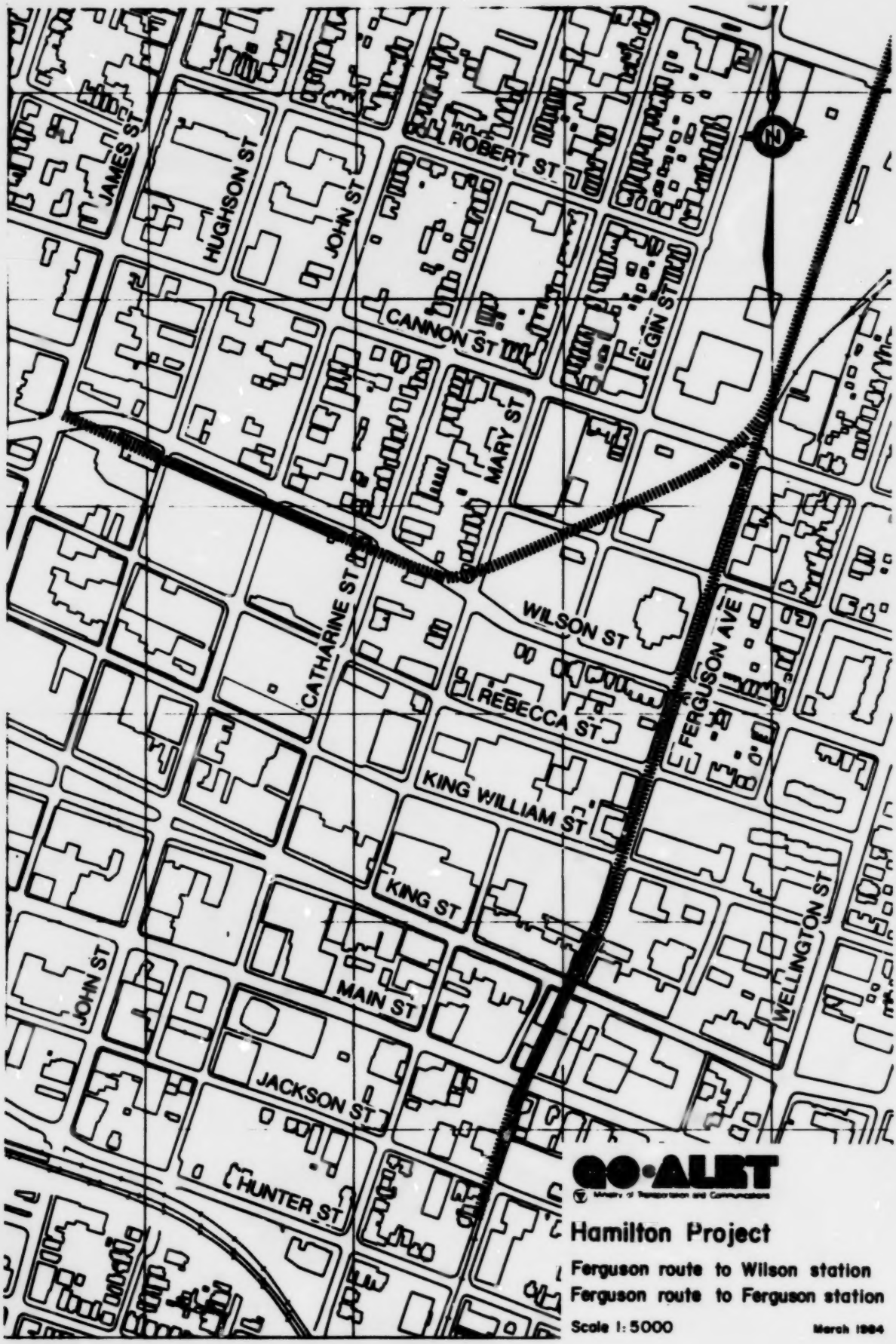
It is most important to encourage ridership on the GO-ALRT System, not only to generate fare revenues, but also to unload other transportation facilities while increasing people activity in the downtown area of Hamilton. This is important in the short term to demonstrate system acceptance, as well as in the long term. The System's acceptance and visibility will be a stimulant to further downtown development and will enhance the economic attractiveness of the downtown area.

It is considered that proximity and easy access to existing development is as important as the need to stimulate new development. The route alternative with a station terminal on the south side of Wilson Street is the better in the case under consideration. The improved systems operations features of the alternative to the Ferguson-King Station, although important, do not outweigh the advantages of the Wilson site.

The route alternative on Ferguson Avenue to a terminal station straddling King and Main Streets is undesirable and should not be pursued further.

RWB:sgr/253

March, 1984




GO-ALERT

Ministry of Transportation and Communications

## Hamilton Project

Ferguson route to Wilson station

Ferguson route to Ferguson station

Scale 1:5000

March 1984

APPENDIX E

GO-ALRT PROGRAM
HAMILTON PROJECT

KING WILLIAM STREET STATION
EVALUATION STUDY

## Introduction

During public review of the evaluation conclusions in December 1983, an alternative was suggested to consider the feasibility of a station located on the south side of King William Street instead of on Wilson Street. The access to both stations would be via Ferguson Avenue.

## Existing Conditions

The alignment geometry is restrained by existing major development - Edgar Davey School, Ontario Hydro transformer, Police Headquarters, MacKenzie Convalescent Home, and commercial buildings along King Street.

There are existing parking lots along much of the south side of King William, through which the alignment would pass. Existing (older) commercial properties which will have to be removed, are located on the west side of Catherine Street and on both sides of John Street.

## Design Consideration

A long tangent is required for the station area, consisting of an approach tangent (22 m), platform (180 m) and run-out (112.5 m). A radius of 750 m is required on curves to achieve full running speed. A reduced radius of 125 m could be accepted in an urban environment.

## Evaluation

The evaluation compares the routes from a common point on Ferguson Avenue, just north of Cannon Street to a station on King William Street vs. a station on Wilson Street. See attached plan.

Service to the Public is indicated to be very similar. There may be slightly more people (population and employees) in proximity to the King William Station. However, there is more opportunity to provide on-site transit interface at Wilson Street. The guideway will pass very close to Edgar Davey School, and would restrict access by the Fire Department in case of an emergency.

**Social/Cultural Environmental** impacts are more significant on the King William alternative. It requires the removal of 16 more residential properties and dislocates 49 more employees. (It is significant that the 25 residences removed are of a class of housing that may not be readily available in Hamilton). There are also residential properties on the east side of Ferguson Avenue between Cannon and Wilson and on the west side of Ferguson at Wilson that are close to the guideway and may experience increased noise impacts. This option does not impact on Beasley Park as does the Wilson option, however.

**Natural Environmental** impacts are insignificant and of little difference.

**Land Use Development** considerations appear to favour the Wilson Station. This option requires the removal of 8 residences and 7 commercial properties, as compared to the King William route which requires the removal of 2 residences, 23 apartment units and 15 commercial properties. Also, the parking lot south of King William Street may be more critical to local business than those on Wilson Street. There is a greater area of vacant land in the immediate vicinity of the Wilson Street Station that could be stimulated for development. At the King William site, the vacant area on the south side of King William is partially occupied by the station platform and is required for station oriented facilities (Kiss'n'Ride, taxi pick-up, transit interface, etc.), while the King Street frontage is fully occupied by retail commercial. Any major office commercial or high density residential development (the most likely type of development to be stimulated by a rapid transit station) would have to take place north of King William Street. Available vacant land is located on the east side of Catherine Street and between Catherine and John Streets as well as between Rebecca and Wilson Streets.

**System Design** considerations probably favour the King William alternative to a minor extent. Because there is a single curve at the station approach, the cross-overs can be located closer to the station, thus improving the turn-back time of trains. However, the requirements for system extendability is no better than with the Wilson Street site since a third track and second platform is required in the future.

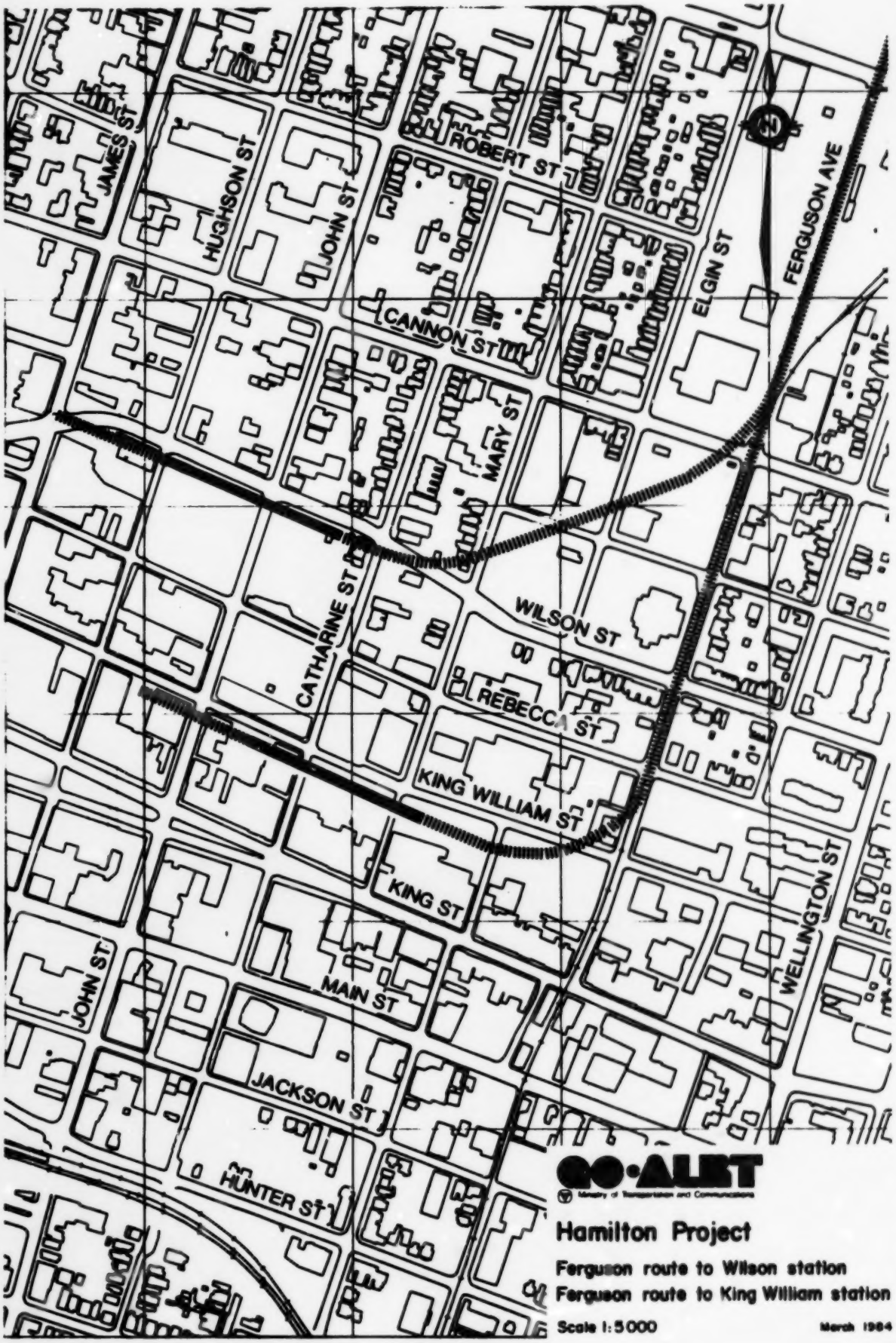
**Cost** of construction is estimated to be $5.5 million more for the King William Station alternative, with half of the increase required for increased property acquisition costs, and the balance for the extra length of elevated guideway.

## Conclusions

The alternative to extend the Ferguson Avenue Option to a terminal station on the south side of King William Street, is less desirable than a terminal on the south side of Wilson Street. Also, it is not feasible to access the King William Street Station site from York Boulevard. It is therefore recommended that no further consideration be given to a King William Street Station for GO-ALRT.

RWB:sgr/237

March, 1984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HUGHSON ST
JOHN ST
ROBERT ST
CANNON ST
MARY ST
ELGIN ST
FERGUSON AVE
CATHARINE ST
WILSON ST
REBECCA ST
KING WILLIAM ST
KING ST
JOHN ST
MAIN ST
JACKSON ST
HUNTER ST
WELLINGTON ST
GO-ALRT
Ministry of Transportation and Communications
Hamilton Project
Ferguson route to Wilson station
Ferguson route to King William station
Scale 1:5000
March 1984

APPENDIX F

GO-ALRT PROGRAM
HAMILTON PROJECT
SYSTEMS OPERATIONS

The following is a discussion of the operating characteristics of the GO-ALRT system in the city of Hamilton upon initiation of service. In particular, a comparison is made between two candidate route alternatives, the York Blvd./Woodbine tunnel option and the Ferguson Avenue option. Consideration is given to the future possibility of an easterly extension.

## DESIGN CRITERIA

The GO-ALRT system is being designed to provide a fast, efficient service considering passenger comfort and safety, and using engineering practices common to rapid transit and railroad systems currently in operation. The speed of the vehicle, upon which schedules of the entire GO system are established, will be 120 km/h. The required geometric standards are a minimum horizontal curve radius of 750 metres and a maximum sustained grade of 2%. Steeper slopes are possible, however their lengths need to be restricted due to their impacts on vehicle speeds. A 3% upgrade can be tolerated for up to 1 kilometre before the vehicle begins to noticeably decelerate; a 4% upgrade can be used only over very short distances (less than 0.5 kilometres). Even on a downgrade, a continuous profile greater than 2% does not provide all the apparent benefits as the vehicle will exert a braking force in order to prevent too much of a speed build-up.

Criteria have been established regarding the superimposition of horizontal and vertical curves. These are based on accepted passenger comfort levels and are functions also of vehicle speed. Ideally, a consistent and acceptable comfort level can be achieved when a change in profile does not coincide with a change in horizontal alignment.

## CROSSOVERS

A critical component of the operation of a rail service, especially at the approach to a terminal, is the location of crossover tracks. These are provided to enable a train on one set of tracks to be switched over to the other set. If it is possible to provide trackage beyond a terminal platform, then only one crossover needs to be provided as an absolute minimum. The Montreal subway uses this method. If this is not feasible then two crossovers (one for each direction travelled) must be located in advance of the platform. The closer they are to the platform itself, the shorter the train turnaround time. The TTC uses dual crossovers in advance of a subway station platform to achieve minimum turnaround time.

Geometric standards for crossovers vary depending upon vehicle speed and may only be located on a straight section of track. The GO system for the most part will utilize a crossover allowing for the maximum possible speed during the transition. The length for a single crossover is approximately 125 metres. It is possible to superimpose the two crossovers over each other, but this is not a common or desirable practice on an elevated guideway section. Maintenance problems, and structural and safety implications are reasons for this. Therefore, on an elevated section, the crossovers must be separated with a short length of tangent track between them. Approximately 275 metres is required in total.

## SCHEDULE

It is planned that the GO-ALRT schedule at the commencement of operations of the West Section (Oakville to Hamilton) will match that of the GO-Train arrival and departure at the Oakville station. Currently, the GO-Train runs every 20 minutes during the peak period and once an hour during off-peak periods. Studies have indicated that there is a potential to reduce peak period headways somewhat. The design of the Oakville station will provide the flexibility to have two GO-ALRT consists meeting the GO-Train and departing two minutes apart.

The system in its mature state will operate from Hamilton to Oshawa with both a Lakeshore Section and a Northern Section through Toronto. Ridership projections indicate that a 6 minute headway will be required to handle the expected volumes. This headway is an average for the Western Section though in reality, it would vary between 4 and 8 minutes. The actual headways into Hamilton will be dependent on connections to the Northern and Lakeshore GO lines at Oakville, and the "fitting-in" of Hamilton trains into the much denser Toronto train service. This may result in station dwell times exceeding the ideal turnaround times permitted by the track geometry. There are also situations such as breakdowns, maintenance works, or emergencies (that are expected to be rare), that will affect the operations. Though the system is capable of operating at 2 minute headways, design of trackage should allow for 4 minute turnaround times.

Another matter that affects the establishing of schedules, especially at a terminal station, is the ability to store a disabled train. It is common practice to provide a separate storage track at a terminal for this purpose either immediately preceeding the platform or following it. This has additional space requirements, as not only does trackage have

to be provided for the disabled train, but turnouts are needed to access it. As a five-car train is 180 metres in length, the space requirements are high. In the absence of a storage track at a terminal, a disabled train must be placed either within the station adjacent to the platform or on the mainline tracks in advance of the station between a set of crossovers. Neither alternative is desirable as, in effect, one track is being eliminated from use either on the mainline or in the station. However, the particular situation may dictate that this is the only practical option available. Hence, the schedule must consider the possibility that, only one track may be useable in the station area.

For reasons discussed above, as well as the desirability to maintain operating schedules with the knowledge that time may be lost as a train proceeds along the system, it is prudent to design a terminal station to allow for one of its tracks to be occupied for a full frequency cycle. Over the long term, trains arriving at Hamilton will have traversed the entire Lakeshore route from Oshawa - a round trip of 3 1/2 hours. Turnaround times at a station should be sufficiently long to allow for schedule recovery and to permit departing trains to be scheduled to make connections and be slotted into the heavier flows downstream.

YORK BLVD./WOODBINE TUNNEL OPTION

This option provides for ideal operations as the crossover tracks are located on the elevated section immediately in advance of the station platform. Though space for storing a disabled vehicle is not available either just preceding or following the station, additional crossovers may be located on the tangent section of the line as it proceeds along York Blvd. Turnaround time is minimized under perfect conditions (2 minutes with both tracks being used, 3.5 minutes with one track used).

The running time from a fixed common point 2 km east of Snake Rd. to the Wilson station along this route is 4.7 minutes without a station stop, and 5.45 minutes with a station. Two horizontal curves of substandard radii (450 m and 300 m) are located on either side of the Hwy. 403/Macklin Road station site, however, their impacts are minimal. No restrictive grades are present on this alignment.

Future easterly extension is accommodated in ideal fashion as the alignment can be extended easterly from the station, north on Ferguson Avenue, and out to Stoney Creek along the CNR corridor. In effect, the Wilson Street station becomes a line station as trains would proceed directly through. The crossovers in advance of the station would allow for short-turning trains, the turnaround time of which can easily be fitted into the schedule. In addition, the flexibility exists to place crossovers and a storage track on the extended portion.

FERGUSON AVENUE OPTION

This option provides for poor operations as the crossovers are located on an elevated section distant from the station. From the front edge of the platform to the far limit of the second crossover is 650 metres as compared to 425 metres on the York Blvd. approach to the same Wilson Street station. The second set of crossovers for train storage must be located an additional 900 m away from the station. Compounding the problems caused by these distances is the lower operating speed of a train on Ferguson Avenue. Three horizontal curves of 160 metre radius limit the speed to 55 km/h, considerably lower than the maximum running speed of 120 km/h. Furthermore, a 4% grade is required in order to cross the CNR tracks east of John Street.

The long distance between the crossovers and the terminal requires an approaching vehicle to wait longer to allow time for another to exit the station. This combined with the relatively low speeds at which movements at the terminal occur results in a minimum turnaround time of 3 minutes with both tracks being used, and 5 minutes with one track being used. Considering the need to accommodate 4 minute headways, plus the fact that trains may have to wait at the station for an opportune departure time, designing terminal trackage with these longer turnaround times is risky. The Ferguson Avenue option would therefore result in having a train sitting on one station track at all times during peak periods. Were any vehicle breakdowns to occur during this period, operating schedules would become virtually impossible to maintain.

The running time from a fixed common point 2 km east of Snake Rd. to the Wilson Station along this shorter route is 5.3 minutes.

Future easterly extension becomes extremely difficult to operate with this option. The preferred route for the extension is to return to Ferguson Avenue and access the CNR corridor. Considering the situation where the same two tracks are used for both Toronto-destined trains and Stoney Creek-destined trains and also the minimum 2 minute system headway capability, there would be at least a 2 minute slot during each 6 minute average cycle that non-conflicting Stoney Creek trains could enter or leave the station. Therefore in an ideal situation, the time spent in negotiating the turnaround including station dwell time would need be either 4 minutes or less, or 6 minutes or more to avoid interfering with other arriving trains. When the time was 4 minutes or less, one station track could be used for all operations. When the time was 6 minutes or more, both tracks would have to be used. However, since it has already been determined that the minimum turnaround time using one track is 5 minutes and that both tracks must be used at the

station anyways without Stoney Creek trains, one cannot superimpose the latter without having three trains in the station simultaneously. A third station track and a second platform become necessities. Furthermore, the track configuration in front of the station cannot allow Stoney Creek trains to conflict with Toronto trains when headways are 4 minutes. For this reason, there has to be an independent Stoney Creek operation from the station with a third track extending the entire length of Ferguson Avenue. This also is not an ideal situation as it becomes a single track operation for approximately one kilometre.

## CONCLUSIONS

The Wilson Street station approach from the west along York Blvd. allows for future headway requirements and direct easterly extension without compromising overall system operations and flexibility. The extra 9 seconds of travel time required (resulting from the additional station at Hwy. 403/Macklin Road) is of no consequence.

The Ferguson Avenue approach to the Wilson Station may not only require an additional train, but has poor extendability characteristics in that a second platform and a third track are required at the station. A transfer is necessitated from the mainline service to the Stoney Creek shuttle service. Furthermore, the restrictions imposed by this option leave very little flexibility for making up time losses or any possible future service improvements.

April, 1984

JK/eb/L:202